

# **CHEMICAL HYGIENE PLAN**

**for the**

## **University of Dayton Modified for: Wright Patterson AFB Locations**

**Reference  
29 CFR 1910.1450  
Occupational Exposure to Hazardous Chemicals in Laboratories**

**Reviewed and Updated – November 2014**

(NOTE: This CHP is intended to implement the CHP in each Directorate at WPAFB as it pertains to UDRI. If this CHP deviates from Wright Patterson Laboratory CHP requirements, the WP Laboratory CHP will be followed.)

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# FORWARD

On January 31, 1990 the Occupational Safety and Health Administration (OSHA) promulgated a final rule for occupational exposure to hazardous chemicals in laboratories. Included in the standard, which became effective on May 1, 1990 is a requirement for all employers covered by the standard to develop and carry out the provision of a Chemical Hygiene Plan (CHP).

A CHP is defined as a written program which sets forth procedures, equipment, personal protective equipment and work practice that are capable of protecting employees for the health hazards presented by hazardous chemicals used in that particular workplace. Components of the CHP must include standard operating procedures for safety and health, criteria for the implementation of control measures, measures to ensure proper operation of engineering controls, provisions for training and information dissemination, permitting requirements, provisions for medical consultation, designation of responsible personnel, and identification of particularly hazardous substances.

The following plan is the Chemical Hygiene Plan developed for the University of Dayton and modified for use at Wright-Patterson AFB in connection with contractual work at that location. The CHP is maintained readily available to all laboratory employees in Environmental Health & Safety/Risk Management located in College Park Center Room 112, during normal working hours. Copies of the CHP are also on hand via the internet web site: <http://www.udayton.edu/~env-safe/>. All laboratory personnel must know and follow the policy and procedures outlined in this plan. All operations performed in the laboratory must be planned and executed in accordance with the enclosed procedures. In addition, each employee is expected to develop safe personal chemical habits aimed at the reduction of chemical exposures to themselves and coworkers.

This document was developed to comply with paragraph (e) of the referenced OSHA 1910.1450 standard. The University of Dayton will maintain the facilities and procedures employed in the laboratory compatible with current knowledge and regulations in laboratory safety. This CHP will be reviewed, evaluated and updated at least annually and is readily available to employees, their representatives and any representatives of the Assistant Secretary of Labor for OSHA.

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# 1 STANDARD OPERATING PROCEDURES FOR LABORATORY CHEMICALS

## 1.1 Chemical Procurement

- 1.1.1 The decision to procure a chemical shall be a commitment to handle and use the chemical properly from initial receipt to ultimate disposal using procedures established by the WPAFB HAZMAT CELL (ext. 79716).
- 1.1.2 Requests for procurement of new chemicals shall be submitted to the Department Supervisor. The appropriate form entitled "Purchasing Request", Appendix B to this plan, shall be used for this purpose. Information on proper handling, storage and disposal shall be known to all involved personnel prior to the procurement of the chemical. Information on chemicals can best be obtained by referring to a Material Safety Data sheet (MSDS) which may be obtained through the potential vendor, or through the WP Division Chemical Hygiene Office (CHO), the local IMMO, or the 74<sup>th</sup> AMDS/SGPB. Personnel who receive chemical shipments shall be knowledgeable of the proper procedures for receipt. Chemical containers shall not be accepted without accompanying labels, materials safety data sheets and packaging in accordance with all appropriate regulations. All chemicals shipments should be dated when received and opened. All chemicals utilized in the laboratory shall be those which are appropriate for the ventilation system.
- 1.1.3 All chemicals MUST be bar coded and entered into the inventory database, by local IMMO personnel, upon entry to WPAFB. All WPAFB rules for entry through Central Receiving, Branch or Division Office must be followed at all times. Large glass containers shall be placed in carrying containers or retained in their original shipping containers during transportation with any WP complex.

## 1.2 Chemical Storage

- 1.2.4 Chemical shall be segregated by hazard classification and compatibility in a well –identified area, with local exhaust ventilation, and/or general exhaust.
- 1.2.5 Doors to storage rooms or cabinets shall be marked with the appropriate hazard class labels.
- 1.2.6 Mineral acids should 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.
- 1.2.7 Acid-resistant trays shall be placed under bottles of mineral acids.
- 1.2.8 Acid-sensitive materials such as cyanides and sulfides shall be separated from acids and/or protected from contact with acids.
- 1.2.9 Highly toxic chemicals or other chemicals whose containers have been opened shall be stored in unbreakable secondary containers.
- 1.2.10 The storage area shall not be used as a preparation or repackaging area.

- 1.2.11 When chemicals are taken for the storage area, they shall be placed in shock-absorbing containers having sufficient capacity to contain the volume of liquid being moved. They may also be transported on a cart with adequate sides to act as secondary containment to contain any volume of liquid being moved.
- 1.2.12 Storage of chemicals at the lab bench or other work areas shall be limited to those amounts necessary for one operation or shift. The container size shall be the minimum convenient. The amounts of chemicals at the lab bench shall be as small as practical. Chemicals in the workplace shall not be exposed to sunlight or heat.

### **1.3 Chemical Handling**

- 1.3.1 Each laboratory employee with the training, education and resources provided by supervision, shall develop and implement work habits consistent with this CHP to minimize personal and coworker exposure to the chemicals in the laboratory. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to all chemicals shall be minimized. General precautions which shall be followed for the handling and use of all chemicals are:
  - 1.3.2 Skin contact with all chemicals shall be avoided.
  - 1.3.3 All employees shall wash all areas of exposed skin prior to leaving the laboratory.
  - 1.3.4 Mouth suction for pipeting or starting a siphon is prohibited.
  - 1.3.5 Eating, drinking, smoking, gum chewing, or application of cosmetics in areas where laboratory chemicals are present shall be prohibited. These areas have been posted. Hands shall be thoroughly washed prior to performing these activities.
  - 1.3.6 Storage, handling and consumption of food or beverages shall not occur in storage areas, refrigerators, glassware or utensils used for laboratory operations.
  - 1.3.7 Risk determinations shall be conservative in nature.
  - 1.3.8 Any chemical mixture shall be assumed to be as toxic as its most toxic component.
  - 1.3.9 Substances of unknown toxicity shall be assumed to be toxic.
  - 1.3.10 Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.
  - 1.3.11 The engineering controls and safety equipment in the laboratory shall be utilized.
  - 1.3.12 The intent and procedures of this Chemical Hygiene Plan shall be continuously adhered to.
  - 1.3.13 When moving compressed gas cylinders, a hand truck shall be used. Under no circumstances shall a cylinder be rolled or dragged, even for a short distance. Valve protective caps shall always be installed before moving gas cylinders.
  - 1.3.14 In all cases of chemical exposure, neither the Permissible Exposure Limits (PELs) of OSHA or the Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH) shall be exceeded.

- 1.3.15 Specific precautions based on the toxicological characteristics of individual chemicals shall be implemented as deemed necessary by the Chemical Hygiene Officer (see 7.2). These special precautions are listed in Section 8.0.

## **1.4 Laboratory Equipment and Glassware**

- 1.4.1 Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled in accordance with Section 1.7. At the completion of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.
- 1.4.2 In addition, the following procedures shall apply to the use of laboratory equipment:
- 1.4.3 All laboratory equipment shall be used only for its intended purpose.
- 1.4.4 All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in the broken glass container.
- 1.4.5 All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
- 1.4.6 Labels shall be attached to all chemical containers, identifying the contents and related hazards. Labels will be provided by the local IMMO to satisfy this requirement. All containers shall comply with the standards identified in each specific Directorate Operating Guidelines.
- 1.4.7 Waste receptacles shall be identified as such.

## **1.5 Personal Protective Equipment**

- 1.5.1 Safety glasses meeting ANSI Z87.1 are required for employees, students, and visitors to the laboratory and will be worn at all times when in the laboratory. Contact lenses are prohibited in the laboratory, except as approved by the Chemical Hygiene Officer and supervisor.
- 1.5.2 Chemical goggles and/or a full-face shield shall be worn during chemical transfer and handling operations as procedures dictate.
- 1.5.3 Sandals, perforated shoes, and bare feet are prohibited. Safety shoes, per ANSI 47 are required where employees routinely lift heavy objects.
- 1.5.4 Lab coats are provided and must be worn in the laboratory. Laboratory coats will be laundered on a periodic basis, not to exceed monthly. Laboratory coats shall be removed immediately upon discovery of significant contamination.
- 1.5.5 Appropriate chemical-resistant gloves based on the Table in Appendix C shall be worn at all times when there may be skin contact with chemicals. Used gloves shall be inspected and washed prior to re-use. Damaged or deteriorated gloves will be immediately replaced. Gloves shall be washed prior to removal from the hands.

- 1.5.6 Thermal-resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal-resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.
- 1.5.7 Respirator usage shall comply with the OSHA Respiratory Protection Standard, 29 CFR 1910.134, and University of Dayton's Respiratory Protection Program. This program is administered through the UD EHS/RM.

## **1.6 Personal Work Practices**

- 1.6.1 Laboratory supervision must ensure that each employee knows and follows the rules and procedures established in this plan.
- 1.6.2 All employees shall remain vigilant to unsafe practices and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must correct unsafe practices and or conditions promptly.
- 1.6.3 Long hair and loose-fitting clothing shall be confined close to the body to avoid being caught in moving machine/equipment parts.
- 1.6.4 Use only those chemicals appropriate for the ventilation system.
- 1.6.5 Avoid unnecessary exposure to all chemicals by any route.
- 1.6.6 Do not smell or taste any chemicals.
- 1.6.7 Encourage safe work practices in coworkers by setting the proper example. Horseplay is strictly forbidden.
- 1.6.8 Seek information and advice from knowledgeable persons, standards and codes about the hazards present in the laboratory. Plan operations, equipment and protective measures, accordingly.
- 1.6.9 Use engineering controls in accordance with Section 3.0.
- 1.6.10 Inspect personal protective equipment prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid exposure. This information is available on the chemicals MSDS, Material Safety Data Sheet.

## **1.7 Labeling**

- 1.7.1 All containers in the laboratory shall be labeled. This includes chemical containers and waste containers. The label shall be either manufacturers' labels, DD Form 2521, or others provided by the IMMO. Containers not bar coded (E.G., beakers, wash bottles, etc.) shall be labeled according to the specific Directorates Operating Guidelines on Container Labeling.
- 1.7.2 The labeling program shall be periodically inspected by the Chemical Hygiene Officer to ensure that labels have not been defaced or removed.

## 1.8 Waste Disposal

A hazardous material used at WPAFB may be identified as hazardous waste requiring disposal if it has outlived its shelf life, has become contaminated with another chemical, has reacted with another chemical to form a third chemical, or is no longer needed. Hazardous waste storage areas are labeled with signs indicating their use, and waste receptacles are labeled as such.

- 1.8.1 An *Initial Accumulation Point* is a designated point within the WPAFB complex that is authorized and permitted by the 88<sup>th</sup> ABW/EMY to store waste prior to disposal. Hazardous waste may be stored at an Initial Accumulation Point for an indefinite period so long as the volume of waste does not exceed 55 gallons (or one quart of acutely hazardous waste). When new permits are required, the IMMO is to be contacted. IMMO personnel will often carry out the procedures necessary for obtaining a permit through the 88<sup>th</sup> ABW/EMY. It will be the responsibility of the government's Primary Storage Area Manager to notify the IMMO for renewal of the permit(s) for their area and ensure that all information on the permit is accurate.
- 1.8.2 The request for disposal of waste will be initiated by the person using the chemical. The request is made to the IMMO, and will identify the specific hazardous materials requiring disposal, the container ID#, the quantity on hand and the location. After receiving this request, the IMMO is responsible for completing the Hazardous Waste Turn-In Form. Forms will be turned in to the government's Unit Environmental Coordinator (UEC) or Alternate before 1300 hours on Monday, Wednesday, and Friday for coordination.
- 1.8.3 An Accumulation Site is a designated, permitted waste storage point that is operated, managed, and maintained by the Defense Reutilization and Marketing Office (DRMO) contractor for waste pick-up and disposal. The government maintains responsibility for the waste while it is stored at the Accumulation Site, and until the waste is transported from WPAFB.
- 1.8.4 The hazardous waste is removed from the Accumulation Site by a qualified hazardous waste contractor under contract to the DRMO.
- 1.8.5 Hazardous waste disposal records are maintained at the IMMO for 3 years. Completed Waste Turn-In forms should be maintained at each Initial Accumulation Point for 3 years.

## 1.9 Termination and Transfer Briefings

All military and government personnel, contractors, visiting scientists, students, etc., must have an exit interview before final departure from any Directorate on WPAFB. All chemicals and created samples must be transferred to a current employee by the IMMO or turned in to the IMMO for redistribution or disposal **before** the individual terminates or transfers. The Supervisor will be responsible for ensuring that this process is completed prior to the individual terminating or transferring.

## 2 CRITERIA FOR IMPLEMENTATION OF CONTROL MEASURES

### 2.1 Air Sampling

- 2.1.1 Air sampling for evaluating employee exposure to chemical substances shall be conducted periodically or as specified by specific codes or regulations. This sampling during annual or periodic/special evaluation conducted by 74<sup>th</sup> AMDS/SGPB on a routine or as requested basis.
- 2.1.2 Upon addition of new chemicals or changes in control procedures, 74<sup>th</sup> AMDS/SGPB should be contacted to determine if additional air sampling is necessary. 74<sup>th</sup> AMDS/SGPB will conduct air sampling if there is reason to believe that exposure levels for regulated substances that require sampling routinely exceed the action level, or in the absence of an action level or PEL. Air sampling also may be conducted if there is reason to believe that exposure levels for regulated substances that require sampling routinely exceed the action level, or in the absence of an action level or PEL.
- 2.1.3 Contact 74<sup>th</sup> AMDS/SGPB **prior** to the use of any highly toxic substances so that air sampling requirements can be determined and conducted if necessary.
- 2.1.4 The results of air sampling studies performed in the laboratory are maintained by the 74<sup>th</sup> AMDS/SGPB and recorded in the shop case file. All 74<sup>th</sup> AMDS/SGPB sampling results shall be reported to the government Chemical Hygiene Officer within 10 working days after receiving them from the analyzing laboratory. **The UD EHS/RM shall be notified of air sampling results in any area where UD employees work at WPAFB. UD employees will be notified and a record will be maintained by UD of this notification.**

### 2.2 Housekeeping

- 2.2.1 Each laboratory worker is directly responsible for the cleanliness of his or her work space, and jointly responsible for common areas of the laboratory. Laboratory management shall insist on the maintenance of housekeeping standards.
- 2.2.2 The following procedures apply to the housekeeping standards of the laboratory:
  - 2.2.2.1 All spills on lab benches or floors shall be immediately cleaned and properly disposed of in the proper container for disposal. Large spills which cannot reasonably be expected to be controlled, will necessitate calling 911 in order to alert the Emergency Response Force on WPAFB. Personnel shall follow the procedures outlined in their laboratory Site Specific spill Plans for all chemical spills.
  - 2.2.2.2 The lab benches shall be kept clear of equipment and chemicals except those necessary for the work currently being performed.
  - 2.2.2.3 The work area shall be cleaned at the end of each operation and/or each shift.
  - 2.2.2.4 All apparatus shall be thoroughly cleaned and returned to storage upon completion of usage.

- 2.2.2.5 All floors, aisles, exits, fire extinguishing equipment, eyewashes, showers, electrical disconnects and other emergency equipment shall remain free of obstruction.
- 2.2.2.6 All labels shall face front.
- 2.2.2.7 Chemical containers shall be clean, properly labeled and returned to storage upon completion of usage.
- 2.2.2.8 All chemical wastes will be disposed of in accordance with the waste disposal plan. (see Section 1.8)

### **2.3 Safety and Emergency Equipment**

- 2.3.1 Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate have been posted on the Emergency Response Placards on each laboratory entry door.
- 2.3.2 All laboratory personnel will be trained in the proper use of fire extinguishers. Prior to the procurement of new chemicals, the Chemical Hygiene Officer shall verify that existing extinguishers and other emergency equipment are appropriate for such chemicals.
- 2.3.3 All employees who might be exposed to chemical splashes shall be instructed in the location and proper usage of emergency showers and eyewashes by their supervisor. The eyewash and emergency shower shall be inspected monthly by the ASC Civil Engineering representative. These inspections shall be performed by the laboratory employees. These inspections shall be in accordance with ANSI Z358.1 and manufacturer's specifications. Records shall be maintained and will be available during the annual laboratory safety inspection done by UD EHS/RM.
- 2.3.4 Location signs for safety and emergency equipment will be posted and visible to all laboratory employees. It is the responsibility of laboratory personnel to know the location of all appropriate equipment.

## **3 Engineering Controls**

### **3.1 Intent**

The engineering controls installed in the laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be realized. Maintenance of engineering controls installed at WPAFB is the responsibility of the government. If UD contractor personnel notice a requirement for maintenance, it will be reported to the Supervisor for relay to the WPAFB appropriate personnel.

### **3.2 Modification**

No modification of engineering controls will occur by laboratory or contractor personnel. Requests for any modification will be directed to the appropriate WPAFB Facilities Manager.

### **3.3 Improper Function**

Improper function of engineering controls must be reported to the WPAFB Chemical Hygiene Officer and WPAFB Facilities Management immediately. The system shall be taken out of service until proper repairs have been executed.

### **3.4 Usage**

#### 3.4.1 Laboratory Hoods

The laboratory hoods shall be utilized for all chemical procedures that might result in release of hazardous chemical vapors or dust. As a general rule, the hood shall be used for all chemical procedures involving substances which are appreciably volatile and have a permissible exposure limit (PEL) less than 50 ppm.

The following work practices shall apply to the use of hoods:

- 3.4.1.1 Confirm adequate hood ventilation performance prior to opening chemical containers inside the hood. An inward flow of air can be confirmed by holding a piece of paper at the face of the hood and observing the movement of the paper.
- 3.4.1.2 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.
- 3.4.1.3 Hoods should not be used to store chemicals and equipment.
- 3.4.1.4 Minimize interference with the inward flow of air into the hood.
- 3.4.1.5 Leave the hood 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.
- 3.4.1.6 All laboratory hoods used to control chemical exposure shall be monitored quarterly on the ventilation program maintained by 74<sup>th</sup> AMDS/SGPB. A record of all measurements shall be maintained by 74<sup>th</sup> AMDS/SGPB and be provided to the WPAFB Chemical Hygiene Officer and the WPAFB Facilities Manager.
- 3.4.1.7 The face velocity of all laboratory hoods will be between 80 and 150 feet per minute (fpm) with a target of 100 fpm.
- 3.4.1.8 The hood shall not be used as a means of disposal for volatile chemicals.
- 3.4.1.9 Openings of portable hoods shall be placed as close as possible to sources of possible air contamination.
- 3.4.1.10 Hood fans typically operate at all times, but dampers must be open, and air flowing when portable hoods are in use.

3.4.1.11 Prior to the introduction of new chemicals, the adequacy of hood ventilation systems shall be determined by the 74<sup>th</sup> AMDS/SGPB.

#### 3.4.2 Glove Boxes and Isolation Rooms

The exhaust air from a glove box or isolation room will pass through scrubbers or other treatment before release into the regular exhaust system.

#### 3.4.3 Storage Cabinets

Storage cabinets for flammable and hazardous chemicals will be ventilated as needed.

## 4 Employee Information and Training

### 4.1 Hazard Information

All employees will be apprised of the hazards presented by the chemicals in use in the laboratory. Each employee shall receive training at the time of initial assignment to the laboratory, prior to assignments involving new exposure situations, and at a regular frequency as determined by the Chemical Hygiene Office.

### 4.2 Notification of Pregnancy

It is the fundamental responsibility of the pregnant worker to decide when, and whether she will formally declare her condition. Early pregnancy notification can help to provide a safe and healthy work environment for the expectant mother and the unborn child (refer to the National Institute for Occupational Safety and Health (NIOSH) publication No. 99-104 "The Effects of Workplace Hazards on Female Reproductive Health"). The pregnant worker should work with their supervisor to determine what chemical, physical or radiological hazards they might be exposed to during their pregnancy to be evaluated by health care professionals. The University of Dayton will provide chemical Safety Data Sheet information upon request. Pregnant employees should consult with their own physicians to receive their pregnancy care and consultation.

### 4.3 Training

This training shall include methods of detecting the presence of a hazardous chemical, physical and health hazards of chemicals in the lab, and measures employees can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan (each employee shall either receive a hardcopy of the CHP or be able to access it on the Internet), and shall include;

- 4.3.1 the contents of the CHP and the OSHA laboratory standard, and its appendices;
- 4.3.2 the location and availability of the Chemical Hygiene Plan;
- 4.3.3 the permissible exposure limits for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory;
- 4.3.4 signs and symptoms associated with exposure to the chemicals present in the laboratory;

- 4.3.5 location and availability of reference material on chemical hygiene;
- 4.3.6 emergency response including evacuation and spill cleanup procedures according to WPAFB policy and procedure.

## **5 Prior Approval of Laboratory Activities**

### **5.1 Special Approval**

Special approval is required for laboratory activities which present specific, foreseeable hazards to the employees. These activities include off-hours work, sole occupancy of buildings, hazardous operations and unattended operations.

#### 5.1.1 Off-Hours Work Procedures

Laboratory personnel are not permitted to work after hours in a WPAFB lab, except by authorization of the Branch Chief whose area of responsibility is involved. The approval of the employee's supervisor is also required.

#### 5.1.2 Sole Occupancy

At no time shall work be performed in the laboratory when the only person in the building is the laboratory person performing the work.

#### 5.1.3 Hazardous Work

All hazardous operations are to be performed during a time when at least two personnel are present at the laboratory. At no time shall a laboratory person, while working alone in the laboratory, perform work which is considered hazardous. The determination of hazardous operations shall be made by the WPAFB CHO, the government Unit Environmental Coordinator (UEC) or alternate.

#### 5.1.4 Unattended Operations

When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:

- 5.1.4.1 Approval is required by the government Technical Area Manager (TAM) or the Branch Chief who has authority over the area in which this operation will take place.
- 5.1.4.2 The laboratory supervisor will review work procedures to ensure for the safe completion of the operation.
- 5.1.4.3 An appropriate sign will be posted at all entrances to the laboratory.
- 5.1.4.4 The overhead lights in the laboratory will be left on.
- 5.1.4.5 Precautions shall be made for the interruption of utility service during the unattended operation (loss of water pressure, electricity, etc.).

5.1.4.6 The person responsible for the operation will return to the laboratory at the conclusion of the operation to assist in the dismantling of the apparatus.

## 6 Medical Consultations and Examinations

**6.1** An opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory. The opportunity for medical attention will be made available to employees under the following circumstances:

- 6.1.1 Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory,
- 6.1.2 Medical surveillance programs will be established where exposure monitoring reveals an exposure level above the action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, and/or,
- 6.1.3 Whenever an event takes place in the laboratory such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure the employee will be provided an opportunity for medical consultation for the purpose of determining the need for medical examination.

**6.2** These medical consultations and examinations shall be provided without cost to the employees, without loss of pay and at a reasonable time and place.

Contractor personnel are not authorized to use government medical facilities on WPAFB **EXCEPT** in life threatening emergencies. For non-life threatening emergencies, UD employees may seek medical care from their own physician or from the Franciscan Occupational Medical Care Centers or the hospital of their choice. Medical consultation and examinations shall be administered by or under the direct supervision of a licensed physician.

6.2.1 Licensed Physician Procedures shall be as follows:

- 6.2.1.1 An MSDS shall be provided as quickly as possible to the physician providing information concerning the chemicals the employee has been handling, conditions of exposure, and signs and symptoms of exposure.
- 6.2.1.2 The physician shall submit a written opinion for each consultation or examination which:
  - 6.2.1.2.1 States the results (this statement shall not include any diagnostic findings which are unrelated to an occupational exposure)
  - 6.2.1.2.2 Verifies that the employee has been given the results.
  - 6.2.1.2.3 Makes recommendation for any medical follow-up, if necessary.

## **7 Chemical Hygiene Responsibilities**

### **7.1 Chief Executive Officer**

Daniel Curran, Ph.D., President of the University of Dayton, has the ultimate responsibility for chemical hygiene throughout the University and with assistance of other program administrators, will provide continued support for chemical hygiene.

### **7.2 University's Chemical Hygiene Officer (UCHO)**

The University's Chemical Hygiene Officer is designated to Robin Oldfield, Director of Environmental Health & Safety/Risk Management who shall:

- 7.2.1 work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices for each University department using laboratory chemicals,
- 7.2.2 monitor procurement and use of chemicals in the lab, including determining that facilities and training levels are adequate for the chemicals in use,
- 7.2.3 monitor regular government, formal chemical hygiene and housekeeping inspections to ensure UD employee compliance.
- 7.2.4 maintain current knowledge concerning the legal requirements of regulated substances in the laboratory,
- 7.2.5 review and improve the Chemical Hygiene Plan on an annual basis,
- 7.2.6 determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order, with the assistance of 74<sup>th</sup> AMDS/SGPB
- 7.2.7 ensure that appropriate training has been provided to employees,
- 7.2.8 ensure that all supervisors and employees are aware of the need to forward all records of employee medical exams, consultations and monitoring to the University Chemical Hygiene Officer for record retention as mandated by OSHA.

### **7.3 Laboratory Supervisors and Group Leaders**

The UD Laboratory Supervisor and/or Group Leader has overall responsibility for chemical hygiene in the laboratory including responsibility in the following areas: work with UCHO, faculty/researchers, and other employees to implement the chemical hygiene policy and develop standard operating procedures for each work task involving chemicals or hazardous materials.

- 7.3.1 perform regular, informal chemical hygiene inspections and ensure good housekeeping practices.
- 7.3.2 ensure that employees know and follow the chemical hygiene rules.
- 7.3.3 determine the proper level of personal protective equipment, ensure that such protective equipment is available and in good working order.

- 7.3.4 ensure that appropriate training has been provided to employees.
- 7.3.5 ensure proper storage, handling, use and disposal of chemicals to prevent possible exposure of employees.
- 7.3.6 ensure proper hazard labeling of all containers of chemicals used or stored in the laboratory.
- 7.3.7 ensure that MSDS's and other reference sources on hazards, safe handling, and disposal of chemicals are available to the laboratory employee.
- 7.3.8 ensure that safety precautions and emergency actions are conveyed to all laboratory employees involved in the use and handling of chemicals
- 7.3.9 know the current legal requirements concerning regulation substances for their area of responsibility.
- 7.3.10 ensure that facilities and training for use of any material being ordered are adequate,
- 7.3.11 send injured or ill employees for medical attention and complete the necessary form Work Related Accident/Illness Report, (Appendix E)

#### **7.4 Laboratory Workers**

The laboratory workers are individually responsible for;

- 7.4.1 planning and conducting each laboratory operation in accordance with the Chemical Hygiene Plan,
- 7.4.2 developing good personal chemical hygiene habits.
- 7.4.3 reporting any faulting equipment or unsafe practices to their supervisor.
- 7.4.4 attend any and all required training sessions that relate to their job function.

## **8 Special Precautions**

When laboratory procedures change to require the use of additional classifications of chemicals (allergens, embryotoxins, teratogens, carcinogens, etc.), additional special precautions shall be implemented as deemed necessary by the Chemical Hygiene Officer. The permit system shall be utilized for all special activities. All questions regarding the use of the permit system should be addressed to the Chemical Hygiene Officer.

### **8.1 Working with Allergens and Embryotoxins (Special Precautions)**

- 8.1.1 Suitable gloves to prevent hand contact shall be worn when exposed to allergens or substances of unknown allergen activity.
- 8.1.2 Employees of child-bearing age will handle embryotoxins only in a hood with confirmed satisfactory performance and will use protective equipment to prevent skin contact as prescribed by the supervisor and Chemical Hygiene Officer.

8.1.3 Embryotoxins will be stored in adequately ventilated areas in unbreakable secondary containers.

8.1.4 The government TAMs, Branch Chiefs, UD on-site supervisor and UD Chemical Hygiene Officer will be notified of spills and other exposure incidents. A physician will be consulted when appropriate.

## **8.2 Working with Chemicals of Moderate Chronic or High Acute Toxicity (Special Precautions)**

8.2.1 Areas where these chemicals are stored and used are of restricted access and have special warning signs.

8.2.2 A special hood with a minimum face velocity of 60 linear feet per minute or other containment device will be used. Released vapors will not discharge with the hood exhaust, but will be trapped.

8.2.3 Gloves and long sleeves will be used. Hands and arms will be washed immediately after working with these chemicals.

8.2.4 Two people will always be present during work with these chemicals.

## **8.3 Working with Chemicals of High Chronic Toxicity (Special Precautions)**

8.3.1 Approval of the supervisor will be obtained before use.

8.3.2 All transfer and work with these substances shall be in a designated area: a restricted access hood, glove box or portion of lab.

8.3.3 The designated area will be marked with warning and restricted access signs.

8.3.4 Any contaminated equipment or glassware will be decontaminated in the hood before removing them from the designated area.

8.3.5 For powders, a wet mop or vacuum with a HEPA filter will be used for cleanup.

8.3.6 Vacuum pumps must have scrubbers or high efficiency particulate absolute (HEPA) filters.

8.3.7 Containers will be stored in a ventilated, limited access area in labeled, unbreakable, chemically resistant, secondary containers.

## **9 Recordingkeeping**

9.1 Accident investigations will be conducted by the immediate supervisor with assistance from WPAFB personnel as required and other University personnel as deemed necessary. Laboratory Accidents must be in writing to the government IMMO. The UD Incident and Hazard

Report form (Appendix D) will be sent to the UD EHS/RM. Supplies of the form can be ordered from the UD EHS/RM.

- 9.2 Exposure records for hazardous chemicals and harmful physical agents will be maintained for 30 years per 29 CFR 1910.20.
- 9.3 Medical records for employees exposed to hazardous chemicals and harmful physical agents will be maintained for the duration of employment plus 30 years per 29 CFR 1910.20.
- 9.4 Inventory and usage records for high risk substances (amounts of substances on-hand, amounts used and names of workers involved) shall be maintained by UD indefinitely.
- 9.5 Records of inspections of equipment will be maintained by the supervisor and kept indefinitely or until the equipment is taken out of use.

Records of employee training will be maintained indefinitely by UD EHS/RM.

## **10 Chemical Spills, Releases, and Accidents**

In the event of a chemical spill, release or other accident, laboratory personnel will adhere to the procedures outlined in the WPAFB Emergency Response Plan as required by OSHA standard 29 CFR 1910.38 and 1910.120. The WPAFB Emergency Response Plan Placards are posted on the entry door of each laboratory. Site specific spill plans are on file in the government IMMO Operations Offices and are posted on the door of each respective laboratory.

## **11 Annual Chemical Hygiene Plan Audit**

The UD Chemical Hygiene Officer will conduct an audit of all phases of the Chemical Hygiene Plan and make necessary revisions at least yearly. Results will be provided to the Laboratory Supervisors and Group Leader. Laboratory Supervisors are responsible for coordinating corrective action with the government on-site responsible personnel.

As part of the annual review of the effectiveness of the program, the following should be considered:

- Number and severity of injuries and illnesses attributed to chemical exposure;
- Number of accidents involving chemicals;
- Number of repeat deficiencies found on laboratory chemical hygiene inspections;
- Number of fires or unwanted reactions involving chemicals
- Training completion status for all laboratory personnel;
- Number of recommendations made to improve laboratory safety, and number still not implemented.

## 12 References and Recommended Reading

National Research Council, Prudent Practices for Handling Hazardous Chemicals in Laboratories, National Academy Press, Washington, D.C. 1981.

National Research Council, Prudent Practices for Disposal of Chemicals from Laboratories, National Academy Press, Washington, D.C., 1983.

Freeman, N.T., Introduction to Safety in the Chemical Laboratory, Academy Press, 1982.

Manufacturing Chemists' Association, Inc., Guide For Safety In The Chemical Laboratory, D. Van Nostrand Company, Inc., 1954.

Green, Michael E., Safety In Working With Chemicals, MacMillan Publishing Co., Inc. 1978.

Pipitone, David A., Safe Storage of Laboratory Chemicals, Wiley & Sons, Inc. 1984.

Code of Federal Regulations, 29 CFR part 1910 subpart Z section 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, 1990.

# **APPENDICES**

## **APPENDIX A**

### ***OSHA STANDARD 29 CFR 1910.1450***

## **APPENDIX B**

### ***CHEMICAL PURCHASING REQUEST FORMS***

## **APPENDIX C**

# ***RESISTANCE TO CHEMICALS OF COMMON GLOVE MATERIALS***

## **APPENDIX D**

### ***INCIDENT AND HAZARD REPORT FORM***

**APPENDIX E**

***WORK RELATED***

***ACCIDENT/ILLNESS/INJURY REPORT***