

CHEMICAL HYGIENE PLAN

for the

University of Dayton

Reference

29 CFR 1910.1450

Occupational Exposure to Hazardous Chemicals in Laboratories

Reviewed and Updated –November 2014

University of Dayton
Environmental Health & Safety/Risk Management
300 College Park
Dayton, Ohio 45469-2905
Phone (937) 229-4503 Fax (937) 229-4395

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 additional precautions with particularly hazardous substances.

The following plan is the Chemical Hygiene Plan developed for the University of Dayton located at 300 College Park, Dayton Ohio. The CHP is maintained and readily available to all laboratory employees in Environmental Health & Safety/Risk Management located at the College Park Center during normal working hours. 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 habits with handling, storing, and disposing of chemicals 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 routinely and is readily available to employees, their representatives and any representatives of the Assistant Secretary of Labor for OSHA.

TABLE OF CONTENTS

<u>Section and Title</u>	<u>Page</u>
FOREWORD.....	2
TABLE OF CONTENTS.....	3
APPENDICES.....	19
1.0 Standard Operating Procedures for Laboratory Chemicals.....	5
1.1 Chemical Procurement	
1.2 Chemical Storage	
1.3 Chemical Handling	
1.4 Laboratory Equipment and Glassware	
1.5 Personal Protective Equipment	
1.6 Personal Work Practices	
1.7 Labeling	
2.0 Criteria for Implementation of Control Measures.....	9
2.1 Air Sampling	
2.2 Housekeeping	
2.3 Safety and Emergency Equipment	
3.0 Engineering Controls.....	10
3.1 Intent	
3.2 Modification	
3.3 Improper Function	
3.4 Usage	
3.4.1 Local Exhaust Ventilation	
3.4.2 Laboratory Hoods	
3.4.3 Glove Boxes and Isolation Rooms	
3.4.4 Cold Rooms and Warm Rooms	
3.4.5 Storage Cabinets	
4.0 Employee Information and Training.....	12
4.1 Hazard Information	
4.2 Pregnancy Notification	
4.3 Training	
5.0 Prior Approval for Laboratory Activities.....	12
5.1 Off-Hours Work Practices	
5.1 Sole Occupancy	
5.1 Hazardous Work	
5.1 Unattended Operations	
6.0 Medical Consultations and Examinations.....	13
7.0 Chemical Hygiene Responsibilities.....	14
7.1 Chief Executive Officer	
7.2 University Chemical Hygiene Officer	
7.3 Departmental Chemical Hygiene Officer	

7.4 Laboratory Workers

8.0 Special Precautions.....16

 8.1 Working with Allergens and Embryotoxins

 8.2 Working with Chemicals of Moderate Chronic or High Acute Toxicity

 8.3 Working with Chemicals of High Chronic Toxicity

 8.4 Working with Animals and Chemicals of High Chronic Toxicity

9.0 Recordkeeping.....17

Appendices.....19

 Appendix A - Laboratory Safety Inspection Form

 Appendix B - Incident and Hazard Report Form

 Appendix C - OSHA Laboratory Standard

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.
- 1.1.2 Requests for procurement of new chemicals shall be submitted to the Department Chair or the Department Supervisor for approval. Information on proper handling, storage and disposal shall be known to all involved personnel prior to the procurement of the chemical. Chemicals utilized in the laboratory shall be those which are appropriate for the ventilation system.
- 1.1.3 All chemicals shall be received in Central Receiving. Personnel who receive chemical shipments shall be knowledgeable of the proper procedures for receipt. Chemical containers shall not be accepted without accompanying labels, material safety data sheets and packaging in accordance with all appropriate regulations. All chemical shipments and containers should be dated when received and opened.

1.2 Chemical Storage

- 1.2.1 No more than 60 gallons of flammable materials can be stored in one fire division. Five gallon containers of flammable chemicals must be stored in an UL approved flammable safety cabinet.
- 1.2.2 Chemicals shall be segregated by hazard classification and compatibility in a well identified area.
- 1.2.3 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.
- 1.2.4 Acid-resistant trays shall be placed under bottles of mineral acids.
- 1.2.5 Acid-sensitive materials such as cyanides and sulfides shall be separated from acids and/or protected from contact with acids.
- 1.2.6 Highly toxic chemicals or other chemicals whose containers have been opened shall be stored in unbreakable secondary containers.
- 1.2.7 The storage area shall be accessible during normal working hours. The storage area is under the control of a designated (by the chairperson or department director) person for each department.
- 1.2.8 When chemicals are taken from the storage area, they shall be placed in an outside container or bucket before transporting.
- 1.2.9 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.

- 1.2.10 Stored chemicals shall be examined at least annually for replacement, deterioration, and container integrity. The inspection should determine whether any corrosion, deterioration, or damage has occurred to the storage area as a result of leaking chemicals.
- 1.2.11 Inventories of chemicals and Material Safety Data Sheets shall be conducted by the department. Unneeded items shall be properly discarded or returned to the storage area.

1.3 Chemical Handling

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:

- 1.3.1 Skin contact with all chemicals shall be avoided. This require personal protective equipment to be worn to protect all exposed skin, including shoes, long pants, long sleeves or laboratory coats, gloves and face shields where necessary.
- 1.3.2 All employees shall wash all areas of exposed skin prior to leaving the laboratory.
- 1.3.3 Mouth suction for pipeting or starting a siphon is prohibited.
- 1.3.4 Eating, drinking, smoking, gum chewing, or application of cosmetics and lotions in areas where laboratory chemicals are present shall be prohibited. Hands shall be thoroughly washed prior to performing these activities.
- 1.3.5 Storage, handling and consumption of food or beverages shall not occur in storage areas, refrigerators, glassware or utensils used for laboratory operations.
- 1.3.6 Risk determinations shall be conservative in nature.
- 1.3.7 Any chemical mixture shall be assumed to be as toxic as its most toxic component.
- 1.3.8 Substances of unknown toxicity shall be assumed to be highly toxic.
- 1.3.9 Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.
- 1.3.10 The intent and procedures of this Chemical Hygiene Plan shall be continuously adhered to.
- 1.3.11 In all cases of chemical exposure, neither the Permissible Exposure Limits (PELs) of OSHA nor the Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH) shall be exceeded.
- 1.3.12 The engineering controls and safety equipment in the laboratory shall be utilized and inspected. Laboratory personnel should perform their own laboratory inspections on a routine basis. EHS/RM performs annual inspections to ensure compliance.

1.4 Laboratory Equipment and Glassware

Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled. At the completion of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.

In addition, the following procedures shall apply to the use of laboratory equipment:

- 1.4.1 All laboratory equipment shall be used only for its intended purpose.
- 1.4.2 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.
- 1.4.3 All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
- 1.4.4 Labels shall be attached to all chemical containers, identifying the contents and related hazards.
- 1.4.5 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. It is strongly recommended that contact lenses not be worn in the laboratory. The lenses can trap particulates or chemicals against the eye causing damage. Contact lenses also restrict the ability to irrigate the eye in the event of chemical contact. Contact lenses are prohibited in the laboratory, except as approved by the Chemical Hygiene Officer and/or supervisor.
- 1.5.2 Chemical goggles, splash goggles and 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, by the department supplying the lab coats. Laboratory coats shall be removed when leaving the laboratory. Long pants shall be worn when working in the laboratory at all times.
- 1.5.5 Appropriate chemical-resistant gloves shall be worn at all times when there may be skin contact with chemicals. Damaged or deteriorated gloves will be immediately replaced.
- 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 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. Students are not permitted to work alone in the labs and must be supervised at all times.**
- 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 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 informative and durable, and at a minimum, will identify contents, source, date of acquisition, storage location and indication of hazard. In addition, waste containers **MUST** be labeled with the words, "Hazardous Waste"; dated when container is considered full and have a tightly closed lid or cap.
- 1.7.2 Portable containers shall be labeled by the individual using the container.

- 1.7.3 Exemptions for labeling requirements shall be made for chemical transfers from a labeled container into a container which is intended only for the immediate use of the employee who performed the transfer.
- 1.7.4 The labeling procedures shall be periodically inspected by the Chemical Hygiene Officer to ensure that labels have not been defaced or removed.

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 as needed or as specified by specific codes or regulations. This determination will be done by the University's Chemical Hygiene Officer

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. Notification of large spills shall be made to EHS/RM x94503 and/or to Public Safety at x92121 or "911".
 - 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 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 of all federal, state, and local regulations. Please call EHS/RM at x94503 for disposal information.

2.3 Safety and Emergency Equipment

- 2.3.1 Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate must be posted in the lab.

All emergency calls should be directed to:

PUBLIC SAFETY - x92121 or “ 911”

- 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 activated and tested weekly by the department. 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 made available during the annual laboratory safety inspection done by the EHS/RM.
- 2.3.4 Location signs for safety and emergency equipment will be posted and visible to all laboratory employees.

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.

3.2 Modification

No modification of engineering controls will occur unless testing indicates that worker protection will continue to be adequate.

3.3 Improper Function

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

3.4 Usage

All employees shall follow proper work practices when using the engineering controls.

3.4.1.1 Laboratory Hoods

The laboratory hoods shall be utilized for all chemical procedures which 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:

- 3.4.2.2 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.
- 3.4.2.3 Keep the hood sash closed at all times except when adjustments within the hood are being made. At these times, maintain the sash height as low as possible.
- 3.4.2.4 Hoods should not be used to store chemicals and equipment.
- 3.4.2.5 Minimize interference with the inward flow of air into the hood.
- 3.4.2.6 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.
- 3.4.2.7 The lab hood shall be inspected annually during the annual laboratory safety inspection conducted by the EHS/RM. The hood face velocity shall be at least 80 feet per minute. A record of each inspection shall be maintained by EHS/RM.
- 3.4.2.8 The hood shall not be used as a means of disposal for volatile chemicals.
- 3.4.2.9 Prior to the introduction of new chemicals, the adequacy of hood ventilation systems shall be determined by EHS/RM.

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 Cold Rooms and Warm Rooms

In event of electrical failure, the following provisions will be followed:

Notify Public Safety at x92121 or “ 911”

Public Safety will contact the troubleshooter to assess the failure. They will notify the appropriate Facilities Management and/or EHS/RM personnel.

3.4.4 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 Officer.

4.2 Pregnancy Notification

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: (1) methods of detecting the presence of a hazardous chemical, (2) physical and health hazards of chemicals in the lab and (3) measures employees can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan, and shall include;

- 4.3.1 the contents of 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;

Training shall be administered by EHS/RM or other laboratory personnel. Individual department's are encouraged to use EHS/RM training materials to conduct their Laboratory Safety Training.

5 Laboratory Activities

5.1 Off-Hours Work Procedures

Laboratory personnel are not permitted to work after hours in the lab, except when permitted or specifically indicated by their job description to work shift hours. This is at the approval of the employee's supervisor. Students working in the labs must be supervised at all times, including off-hour work shifts.

5.2 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. Under unusual conditions, crosschecks, periodic security checks, closed circuit television, or other measures may be taken when permitted.

5.3 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 laboratory supervisor.

5.4 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:

- 5.4.1 The laboratory supervisor will review work procedures to ensure for the safe completion of the operation.
- 5.4.2 The overhead lights in the laboratory will be left on.
- 5.4.3 Precautions shall be made for the interruption of utility service during the unattended operation (loss of water pressure, electricity, etc.).
- 5.4.4 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 specific hazards 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 will be provided without cost to the employee, without loss of pay and at a reasonable time and place.
- 6.3** These medical consultations and examinations shall be administered by or under the direct supervision of a licensed physician.

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 the Director of EHS/RM, Robin Oldfield, 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 perform regular, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment,
- 7.2.4 help project directors develop precautions and adequate facilities,
- 7.2.5 maintain current knowledge concerning the legal requirements of regulated substances in the laboratory,
- 7.2.6 review and improve the Chemical Hygiene Plan on an annual basis,
- 7.2.7 maintain overall responsibility for the laboratory operation,
- 7.2.8 ensure that workers know and follow the chemical hygiene rules,

- 7.2.9 determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order,
- 7.2.10 ensure that appropriate training has been provided to employees,
- 7.2.11 monitor the waste disposal program.

7.3 Departmental Chemical Hygiene Officer (DCHO)

The Departmental Chemical Hygiene Officer will be designated by each Department chairperson or director that uses laboratory chemicals. A memo to the EHS/RM naming this person with their campus address and phone number will be forwarded yearly. This Departmental Chemical Hygiene Officer shall:

- 7.3.1 work with UCHO, faculty/researchers and other employees to develop and implement an appropriate chemical hygiene policy and practices for their department,
- 7.3.2 monitor procurement and use of chemicals in the department, including determining that facilities and training levels are adequate for the chemicals in use,
- 7.3.3 perform regular, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment,
- 7.3.4 review and improve the Chemical Hygiene Plan on an annual basis,
- 7.3.5 maintain overall safety responsibility for the laboratory operation,
- 7.3.6 ensure that workers know and follow the chemical hygiene rules,
- 7.3.7 determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order,
- 7.3.8 ensure that appropriate training has been provided to employees,
- 7.3.9 monitor the waste disposal program.

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. If no action is taken filing and Incident and Hazard Report Form to EHS/RM.

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.

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 supervisor and 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 All transfer and work with these substances shall be in a designated area: a restricted access hood, glove box or portion of lab.
- 8.3.2 Approval of the supervisor will be obtained before use.
- 8.3.3 Vacuum pumps must have scrubbers or high efficiency particulate absolute (HEPA) filters.
- 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 The designated area will be marked with warning and restricted access signs.
- 8.3.7 Containers will be stored in a ventilated, limited access area in labeled, unbreakable, chemically resistant, secondary containers.

8.4 Working with Animals and Chemicals of High Chronic Toxicity (Special Precautions)

- 8.4.1 For large scale studies, special facilities with restricted access will be provided.
- 8.4.2 The substance will be administered by injection when possible rather than by diet. When diet is used, a caging system under negative pressure or under laminar air flow directed toward HEPA filters will be used.
- 8.4.3 Procedures will be used to minimize contaminated aerosol from food, urine and feces:
 - HEPA filtered vacuum equipment for cleaning.
 - Moisten contaminated bedding before removal from cage.
 - Mix diets in closed containers in hood.
- 8.4.4 Plastic or rubber gloves and fully buttoned lab coats will be worn while in the animal room.

9 Recordingkeeping

- 9.1 Accident investigations will be conducted by the immediate supervisor with assistance from other University personnel as deemed necessary.
- 9.2 Accidents reports (Incident and Hazard Report Forms) will be sent to the EHS/RM and retained indefinitely.
- 9.3 Exposure records for hazardous chemicals and harmful physical agents will be maintained for

30 years per 29 CFR 1910.20.

- 9.4** 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.
- 9.5** Inventory and usage records for high risk substances (amounts of substances on-hand, amounts used and names of workers involved) shall be maintained indefinitely.
- 9.6** Records of inspections of equipment will be maintained by the supervisor and kept indefinitely or until the equipment is taken out of use.
- 9.7** Records of employee training will be maintained for indefinitely by EHS/RM.

10 Chemical Spills, Releases, and Accidents

In the event of a chemical spill, release or other accident, The University of Dayton will adhere to the procedures outlined in the Emergency Response Plan as required by OSHA standard 29 CFR 1910.38 and 1910.120.

11 Annual Chemical Hygiene Plan Audit

The Chemical Hygiene Officer with the assistance of EHS/RM personnel, will conduct an audit of all phases of the Chemical Hygiene Plan each year. Results will be provided to the ranking supervisor and the Department chairperson or laboratory manager. Supervisors are responsible for taking corrective action.

12 References and Recommended Reading

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.

Appendix A

Laboratory Inspection Form

Appendix B

Incident Hazard Report Form

Appendix C

29 CFR 1910.1450