



Chemical Hygiene Plan

Department of Environmental Health And Safety

Revised August, 2007

FOREWORD

The Occupational Safety & Health Administration (OSHA) published its final rules for occupational exposure to hazardous chemicals in the laboratory on January 31, 1990. The procedures contained in this Chemical Hygiene Plan have been developed by the Cleveland State University Department of Environmental Health & Safety, for the purpose of maintaining University compliance with applicable regulations and addressing laboratory safety in conjunction with provisions set forth by the OSHA in 29 CFR 1910.1450. These regulations became applicable to instrumentalities of the State of Ohio in March of 1993 by action of the Ohio Legislature.

A Chemical Hygiene Plan (CHP) is defined as a written program that sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace. Components of this CHP include: Standard operating procedures for safety and health, criteria for the implementation of control measures, measure 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 Director of Environmental Health & Safety, in the capacity as University Compliance Officer, serves as the University Chemical Hygiene Officer. The Chemical Hygiene Officer shall review and evaluate this Chemical Hygiene Plan on an annual basis, make any revisions as needed, and communicate those revisions to affected employees. The University Chemical Hygiene Plan is readily available to affected employees in laboratories where hazardous chemicals are used.

TABLE OF CONTENTS

<u>SECTION AND TITLE</u>	<u>PAGE</u>
Foreword.....	2
Table of Contents	3 - 4
List of Appendices	5
1.0 Standard Operating Procedures for Laboratory Chemicals	6
1.1 Chemical Procurement	6
1.2 Chemical Storage	6, 7
1.3 Chemical Handling	7, 8
1.4 Personal Protective Equipment	8
1.5 Personal Work Practices	9
1.6 Housekeeping, Laboratory, and Glassware	9, 10
1.7 Labeling	10
2.0 Criteria for Implementation of Control Measures	10
2.1 Air Sampling	10
2.2 Safety and Emergency Equipment	10, 11
2.3 Inspections	11, 12
3.0 Engineering Controls	12
3.1 Local Exhaust Ventilation	12
3.2 Laboratory Hoods	12, 13
4.0 Employee Information and Training	13
4.1 Hazard Information	13
4.2 Training.....	14

5.0	Prior Approval for Laboratory Activities.....	14
5.1	New Experiments and Procedures.....	14, 15
5.2	Notification System & Off-Hours Access.....	15, 16
6.0	Medical Consultations and Examinations	16, 17
7.0	Chemical Hygiene Responsibilities	17
7.1	Chemical Hygiene Officer (University).....	17, 18
7.2	Chemical Hygiene Officer (Departmental).....	18, 19
7.3	Laboratory Supervisor/Project Director	19, 20
7.4	Laboratory Workers	20
8.0	Special Precautions	20
8.1	Working with Allergens and Embryotoxins	20
8.2	Working with Chemicals of Moderate, Chronic or High Acute Toxicity	21
8.3	Working with Chemicals of High Chronic Toxicity	21
8.4	Working with Animals and Chemicals of High Chronic Toxicity	22
9.0	Recordkeeping	22
10.0	Chemical Spills, Releases and Accidents	23
11.0	Annual Chemical Hygiene Audit	23

List of Appendices

<u>Appendix A</u>	New Chemical Purchasing Request Form
<u>Appendix B</u>	Glove Compatibilities
<u>Appendix C</u>	Lab Inspection Form
<u>Appendix D</u>	Safety Equipment Inspection Form
<u>Appendix E</u>	Fume Hood Standard Operating Procedures
<u>Appendix F</u>	New Experiment Proposal Form
<u>Appendix G</u>	Accident/Incident Report Form
<u>Appendix H</u>	Accident Investigation Form

1.0 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 departmental Chemical Hygiene Officer for review and approval, with copies forwarded to the University Chemical Hygiene Officer. “New” chemicals are defined as those which are not included in a Department’s Chemical Inventory. Submittals for new chemicals shall be facilitated by potential users by completing the form “New Chemical Purchasing Request” (see Appendix A). Employees shall review the Material Safety Data Sheets (MSDS) for each new chemical **PRIOR** to actually beginning work.
- 1.1.3 Departmental personnel who are authorized to receive shipments of chemicals shall be knowledgeable regarding procedures for receipt.

1.2 Chemical Storage

- 1.2.1 Once received, chemicals shall be immediately moved to the designated storage area for the department.
- 1.2.2 The storage area shall be labeled as such and well-illuminated. Chemicals are to be segregated based on hazard classification and chemical compatibility.
- 1.2.3 Mineral acids (i.e. hydrochloric, nitric, phosphoric, sulfuric) should be separated from flammable and combustible materials. Separation is defined as storage within the same fire area but separated by as much space as practical (National Fire Protection Association Standard 49).
- 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 or protected from contact with acids.
- 1.2.6 Any chemicals whose containers have been compromised shall be immediately placed into secondary containers to minimize release,

and then disposed of in the proper manner. Clean up any spills promptly. Contact the Department of Environmental Health & Safety for large spills or if assistance is required.

- 1.2.7 The storage area is to remain secured at all times, accessible to authorized personnel only.
- 1.2.8 Chemicals shall be transported by placing in a secondary container to minimize potential release.
- 1.2.9 Chemical quantities brought to the lab bench shall be as small as is practical. Following the day's work, all chemicals shall be returned to their appropriate storage area. Chemicals shall not be routinely stored at the lab bench (routine is defined as greater than one continuous 24-hour period).
- 1.2.10 Permanent storage of chemicals inside chemical hoods is prohibited. Small amounts of chemicals (in beakers, squeeze bottles etc...) necessary for lab experimentation may be kept under the hood during the experimentation process. Upon completion of the day's activities, these small amounts if not used up, are to be returned to the chemical storage area.

1.3 Chemical Handling

Laboratory employees are expected to develop skills and perform work in a manner consistent with good laboratory practice as set forth by this Chemical Hygiene Plan. With the understanding that all chemicals potentially may pose a hazard to an individual, measures are to be taken that minimize exposure to all chemicals.

General Precautions which shall be followed for the handling and use of all chemicals are:

- 1.3.1 Employees shall wash their hands upon entering and prior to leaving the laboratory. Efforts shall be made to reduce chemical contact with the skin.
- 1.3.2 Pipetting by mouth is expressly prohibited.
- 1.3.3 Eating, drinking, smoking, chewing gum, or applying cosmetics in laboratories is prohibited.
- 1.3.4 Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.

- 1.3.5 Should special precautions based on the toxicological properties of an individual be indicated, those precautions shall be implemented by the departmental Chemical Hygiene Officer, and notification made to the University Chemical Hygiene Officer. (Refer to Section 8.0)

1.4 Personal Protective Equipment

- 1.4.1 Safety glasses meeting the American National Standards Institute (ANSI) Standard Z87.1 are required for laboratory occupants and visitors and are considered minimum eye protection. Contact lenses are prohibited in areas of chemical use and storage.
- 1.4.2 Chemical goggles (and in some instances a full face shield) shall be worn during chemical transfer and handling.
- 1.4.3 Sandal, perforated shoes, and bare feet are prohibited
- 1.4.4 Appropriate personal protective equipment (PPE) including but not limited to chemical goggles, gloves, aprons, etc...shall be worn and properly maintained. All PPE should be inspected prior to and following use for any damage or contamination that may impede proper performance.
- 1.4.5 Laboratory coats shall be laundered on a periodic basis. Any lab coats found to have significant contamination shall be immediately taken out of use.
- 1.4.6 All laboratory personnel shall ensure that any gloves worn are compatible with the specific chemical they will be using. A partial list of common chemical compatibilities for gloves can be found in Appendix B. For additional assistance, please contact the Department of Environmental Health & Safety.
- 1.4.7 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.
- 1.4.8 Laboratory personnel shall not wear any device labeled as a respirator unless authorized by the University Chemical Hygiene Officer. Any usage of respiratory protection shall be in compliance with the Cleveland State University Respiratory Protection Program, and shall include medical evaluations and

monitoring, pulmonary function examinations and respirator fits tests.

1.5 Personal Work Practices

- 1.5.1 All employees and laboratory personnel shall conduct themselves in a professional manner in accordance with acceptable laboratory procedures. Any unsafe practices, behaviors or conditions discovered in the laboratory shall be immediately reported to the Project Director or Laboratory Supervisor.
- 1.5.2 Academic laboratories with student laboratory sessions in progress shall have an authorized person providing supervision in the laboratories at all times.

1.6 Housekeeping, Laboratory Equipment and Glassware

- 1.6.1 Each laboratory worker is directly responsible for the cleanliness of his or her work space, and jointly responsible for common areas of the laboratory.
- 1.6.2 All spills on lab benches or floors shall be immediately cleaned and properly disposed of. Large spills (defined as greater than one liter) should not be handled by the laboratory staff. Contact the Department of Environmental Health and Safety through the Physical Plant Dispatch (Extension 2500) or after 5:00pm via Campus Police Emergency (2111).
- 1.6.3 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 project, the work area shall be thoroughly cleaned, equipment properly cleaned and stored and all chemicals returned to proper storage areas.
- 1.6.4 The lab benches shall be kept clear of equipment and chemicals except those necessary for the work currently being performed.
- 1.6.5 All floors, aisles, exits, fire-extinguishing equipment, eyewashes, showers, electrical disconnects and other emergency equipment shall remain unobstructed.
- 1.6.6 All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in puncture-resistant container that will prevent cutting or abrasions

during handling. Each container shall be properly closed and labeled as to its contents.

1.6.7 All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.

1.6.8 Waste receptacles shall be defined as such.

1.6.9 All chemical wastes will be disposed of in accordance with the regulatory guidelines set forth for Cleveland State University Hazardous Waste Contingency Plan, Appendix C. For assistance, contact the Department of Environmental Health and Safety.

1.7 Labeling

1.7.1 All containers in the laboratory shall be labeled. This includes chemical containers and waste containers. Chemical labels shall be informative and durable, and at a minimum will bear the identity of the product and the degree of hazard in accordance with the Cleveland State University's Hazard Communication Program.

1.7.2 Portable containers shall be labeled by the individual using the container.

2.0 Criteria for Implementation of Control Measures

2.1 Air Sampling

2.1.1 Should air sampling for evaluating employee exposure to chemical substances be indicated, it shall be conducted by the Department of Environmental Health & Safety.

2.2 Safety and Emergency Equipment

2.2.1 Emergency telephone numbers shall be posted and shall include at a minimum Campus Police, Environmental Health and Safety, Department Chairperson and Laboratory Supervisor/Project Director who is responsible for the laboratory.

2.2.2 All laboratory personnel shall receive training on the proper use of fire extinguishers upon initial assignment to work in a laboratory and annually thereafter.

2.2.3 All employees and lab personnel shall be instructed in the location and proper usage of emergency showers and eyewashes and first aid kits.

- 2.2.4 The Department of Environmental Health and Safety shall visually inspect eyewashes and emergency showers and document such inspections on a monthly basis (See Appendix D).
- 2.2.5 Physical Plant plumbers shall perform semi-annual maintenance checks of eyewash and emergency showers.
- 2.2.6 Signage identifying the location signs for safety and emergency equipment shall be present including fire extinguishers, first aid kits, eye wash stations and emergency showers.

2.3 Laboratory Inspections

- 2.3.1 All laboratories shall be subject to unannounced inspection by the Department of Environmental Health and Safety on a semester by semester basis. Laboratories may also be periodically inspected by departmental chemical hygiene officers and/or personnel responsible for lab safety, if applicable.
- 2.3.2 Copies of lab inspection forms (Appendix C) shall be provided to the Laboratory Supervisor and the Department Chairperson and/or the Departmental Chemical Hygiene Officer. Efforts shall be made to correct any deficiencies noted as soon as possible. Labs may be re-inspected to determine compliance.
- 2.3.3 All laboratory equipment shall be visually inspected before each use by the user and formally inspected by the Chemical Hygiene Officer, or his/her designee, as part of the routine laboratory inspection process. Damaged or inoperable equipment shall be taken out of service and replaced or repaired as necessary.
- 2.3.2. The Department of Environmental Health & Safety shall facilitate performance evaluations and inspections of laboratory chemical fume hoods on a quarterly basis. At least one evaluation shall be performed by an outside company qualified to perform hood balancing and testing. Specific information regarding laboratory chemical fume hoods can be found in the Cleveland State University Standard Operating Procedure (SOP) for Laboratory Chemical Fume Hoods (Appendix E).
- 2.3.3. Stored chemicals shall be examined periodically by the users for proper labeling and container integrity. Should the examination result in the discovery of corrosion, deterioration, leaks, or damage, the chemical(s) should be disposed of properly as per Appendix C of the Cleveland State University Hazardous Waste

Contingency Plan. Labels that have become compromised shall be removed and the item re-labeled with the appropriate information, as per the University's Hazard Communication Standard.

- 2.3.4. The Chemical Hygiene Officer shall evaluate the integrity of stored chemicals as part of the laboratory inspection process.

3.0 Engineering Controls

Laboratories are designed and equipped with various engineering controls to facilitate safe use. Examples of such engineering controls include but are not limited to general ventilation systems, chemical hoods, local exhaust systems, glove boxes, laminar flow units and climate controlled storage units. These engineering controls may only be modified by personnel qualified to perform such activities. Requests for such modification shall be placed with the University Chemical Hygiene Officer.

3.1 Local Exhaust Ventilation

Local exhaust ventilation refers to canopy ("point-of-use")hoods

- 3.1.1 Opening of vents shall be placed as close as possible to sources of the air containment.
- 3.1.2 Make sure the screen on the face of the vent is clean and unobstructed prior to usage.
- 3.1.3 After use, allow the fan to operate for an additional period of time to sufficiently clear contaminants from the ductwork.
- 3.1.4 Canopy hoods should never be used as a substitute for laboratory procedures employing chemicals whose use mandates a chemical fume hood.
- 3.1.5 Prior to any change in laboratory procedures where new chemicals are used, the adequacy of the ventilation system shall be determined by the University Chemical Hygiene Officer.

3.2 Laboratory Chemical Fume Hoods

Note: The term laboratory fume hood is commonly used to refer to that engineering control used for working with hazardous chemicals that generate volatile vapors potentially capable of impacting human health.

Although a “fume” is not a gas but rather a flux of solid particles resulting from condensation or aggregation during the welding process, references to these engineering controls as laboratory “fume” hoods have persisted. For purposes of this Chemical Hygiene Plan, references shall be made as to the use of “laboratory fume hoods and/or fume hoods”.

Where the use of a particular chemical substance requires a laboratory fume hood as deemed necessary by the manufacturer, all users shall not expose such chemicals to an environment outside of a laboratory fume hood.

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

- 3.2.1 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.
- 3.2.2 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.
- 3.2.3 Do not permanently store any chemicals inside a chemical fume hood; use only quantities necessary for the days work and return all unused chemicals to their appropriate storage area/cabinet.
- 3.2.4 Leave the hood operating at all times during a laboratory procedure when chemicals are contained inside the hood, including procedures or experiments that extend beyond normal working hours.
- 3.2.5 No chemical or hazardous waste shall be stored inside chemical fume hoods.
- 3.2.6 For additional operating procedures for chemical fume hoods, see the section on General Work Practices for Chemical Fume Hoods contained in the Cleveland State University Standard Operating Procedure for Chemical Fume Hoods (Appendix E).

4.0 Employee Information and Training

4.1 Hazard Information

Each employee affected by this plan (faculty, staff and student employees) will be apprised of hazards presented by chemicals used in the laboratory

setting. Such hazard information is set forth in conjunction with the Cleveland State University Hazard Communication Program.

4.2 Training

Each employee shall be provided with training at the time of initial assignment to a laboratory, annually thereafter and in the event changes are made to laboratory procedures or assignment of personnel. The training modules shall consist of:

- 4.2.1 Proper identification, safe handling and use of hazardous materials.
- 4.2.2 Adequate labeling protocol.
- 4.2.3 Personal Protective Equipment.
- 4.2.4 The permissible exposure limits (PELs) for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory;
- 4.2.5 Signs and symptoms associated with exposure to the chemicals present in the laboratory;
- 4.2.6 Location and use of Material Safety Data Sheets for laboratory chemicals.
- 4.2.7 References to the OSHA Laboratory Standard and appendices
- 4.2.8 The location and availability of the Chemical Hygiene Plan
- 4.2.9 Appropriate references to elements of related University Programs including the Hazard Communication Program and the Hazardous Waste Contingency Plan.

5.0 Prior Approval of Laboratory Activities

5.1 New Experiments and Procedures

Prior to beginning an experiment that has not been performed at the University, or upon significant hazard modification to an existing experiment, an employee shall submit copies of the proposed experiment's procedures and related information to the department chairperson, laboratory supervisor/project director if applicable, and the Chemical

Hygiene Officer. The form found in Appendix F should be used to request performing new experiments.

5.1.1 The submitted proposal shall include:

5.1.1.1 Step by step procedures for the experiment

5.1.1.2 A list of chemicals to be used in the experiment accompanied by Material Safety Data Sheets, if available.

5.1.1.3 Location (building and room) where the proposed experiment is to take place.

5.1.2 The Chemical Hygiene Officer shall review the proposed procedures, evaluate any personal protective equipment or other engineering controls indicated, storage requirements and together with the department chairperson, verify the department has the physical facilities present to safely perform the experiment.

5.1.3 Approval for the proposed experiment shall be provided by documentation bearing the signature of the department chairperson, the laboratory supervisor/project director if applicable, and the Chemical Hygiene Officer.

5.2 Notification System & Off-Hours Access

There are certain activities that may present specific, foreseeable hazards to employees. These activities include off-hours work and unattended operations. A notification system shall be used where the Laboratory Supervisor shall notify (electronic correspondence is acceptable) the department chairperson and the Chemical Hygiene Officer of the Location, the work to be done, and the names and CSU identification numbers of authorized employees that will be present.

Off-Hours Access to Campus Buildings can be facilitated by the following procedure:

1. Obtain an *Authorization for Special Admittance to University Buildings* form from the Campus Police Department. This form is a “semester-only” form, so a new form will need to be filled out each semester.

2. This form can be faxed to faculty member or administrator by calling Campus Police Department personnel responsible at extension 4349 or 2184.
3. Fill out the form and return it to the Campus Police Department as per instructions on the form (copies of the form are not included as part of this written program for security reasons at the instruction of the Campus Police Department).
4. Please note this form refers to EXTERIOR BUILDING DOORS ONLY.
5. Forms will be kept on file in the Campus Police Dispatch Office.
6. Authorized students or other designated personnel can obtain building access by visiting the Campus Police Dispatch Office, Chester Building Annex, and requesting access.

5.2.1. Off-Hours

Off-hours work is defined as work performed outside of normal University business hours (11:00pm – 6:00am) during the week, on Sundays, holidays and at any other time when the University is closed.

5.2.2 Unattended Operations

When laboratory operations are performed that will be left in progress and unattended by laboratory personnel (continuous operations, overnight reactions, etc.) the notification system will be also be used, and the laboratory supervisor/project director shall also:

5.2.2.1 Post an appropriate sign on the inside of the laboratory door indicating that an experiment is in progress

5.2.2.2 The lights to the laboratory will be left on.

6.0 Medical Consultation 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
 - 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 consultations 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, and at a reasonable time and place.
- 6.3** These medical consultations and examinations shall be administered by or under the direct supervision of the University Physician. Employees seeking a medical consultation should consult the University's Health Services office.

7.0 Chemical Hygiene Responsibilities

7.1 Chemical Hygiene Officer (University)

The Director of Environmental Health & Safety, in the capacity as University Compliance Officer, serves as the University Chemical Hygiene Officer. Individual departments may appoint a Departmental Chemical Hygiene Officer who will work closely with the University Chemical Hygiene Officer to ensure the elements of this program are adhered to. The duties of the University Chemical Hygiene Officer:

- 7.1.1 work with administrators, departmental chemical hygiene officers, and other employees to develop and implement appropriate chemical hygiene policies and practices;
- 7.1.2 evaluate procurement and use of chemicals in the lab, including determining that facilities and training levels are adequate for the chemicals in use;
- 7.1.3 perform laboratory inspections and chemical hygiene evaluations on a routine basis;

- 7.1.4 Together with the Departmental Chemical Hygiene Officer, assist laboratory supervisors/project directors in development of adequate precautions and facilities;
- 7.1.5 maintain current knowledge concerning the legal requirements of regulated substances in the laboratory;
- 7.1.6 review and update if indicated, the University's Chemical Hygiene Plan on an annual basis;
- 7.1.7 maintain overall responsibility for the laboratory operation;
- 7.1.8 determine the proper level of personal protective equipment, and ensure that such protective equipment is made available
- 7.1.9 ensure that appropriate training has been provided to employees;
- 7.1.10 monitor the waste disposal program;
- 7.1.11 develop and maintain a list of all chemicals used in the department and maintain a file with an MSDS for each such chemical;
- 7.1.12 review the use of new chemicals and experiments; review modified experiments;
- 7.1.13 facilitate performance evaluations of the laboratory ventilation system (chemical fume hoods);
- 7.1.14 Inspect chemicals for deterioration and verify container integrity

7.2 Chemical Hygiene Officer (Departmental)

Individual departments may assign a qualified individual to serve as a Departmental Chemical Hygiene Officer. This individual will assist the University Chemical Hygiene Officer in ensuring compliance with the provisions of this program and the OSHA Laboratory Standard. Departmental Chemical Hygiene Officers will:

- 7.2.1 work the University Chemical Hygiene Officer, department chairs, and departmental personnel to ensure safe laboratory practice in University facilities.
- 7.2.2 evaluate procurement and chemical use in the laboratories

- 7.2.3 physically visit laboratories on a routine basis, looking for proper chemical storage and integrity, and reporting any instances of non-compliance to the University Chemical Hygiene Officer.
- 7.2.4 together with the University Chemical Hygiene Officer, assist laboratory supervisors/project directors in development of adequate precautions
- 7.2.5 determine proper level of personal protective equipment, and ensure that such equipment is made available
- 7.2.6 review the use of any new chemicals and experiments

7.3 Laboratory Supervisor/Project Director

The Laboratory Supervisor may function as a Researcher or Project Director. The Laboratory Supervisor is directly responsible for maintaining the lab facilities and practices in accordance with the policies and procedures set forth in this Chemical Hygiene Plan.

Duties of the Laboratory Supervisor/Project Director:

- 7.3.1 Ensure that each employee knows and follows the rules and procedures established in this plan;
- 7.3.2 In cooperation with the Chemical Hygiene Officer(s), determine the need for eye and face protection for the work being performed and insure that proper protection is worn;
- 7.3.3 In cooperation with the Chemical Hygiene Officer(s), determine the need for hand and body protection for the work being performed and insure that proper protection is worn;
- 7.3.4 Ensure laboratory workers are familiar with the location and operation of laboratory emergency equipment including first aid kits, eyewash stations and emergency showers;
- 7.3.5 Follow the Cleveland State University Hazardous Waste Contingency Plan which identifies Emergency Procedure for Hazardous Waste and Chemical Spills;
- 7.3.6 Ensure a Cleveland State University Accident/Incident Report (Appendix G) is filled out by any employees, students or visitors if an injury/illness occurs in your laboratory. Signature of the employee's supervisor is required on the form;

7.3.7 Perform an investigation into the accident/incident and report findings using and Accident Investigation Form (Appendix H)

7.3.8 Assist in performing the annual review of the Chemical Hygiene Plan by providing input to the Chemical Hygiene Officer(s).

7.4 Laboratory Workers

These are employees of Cleveland State University other than the Laboratory Supervisor or Project Director, whose duties involve working in a chemical laboratory

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 and maintaining good personal chemical hygiene habits.

8.0 Additional (Specialized) Precautions

When laboratory procedures are intended that 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(s). The form for new or modified lab experiments should be filled out (see Section 5.1).

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 Women 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 Project Director and Chemical Hygiene Officer will be notified of spills and other exposure to incidents. A physician will be consulted when appropriate.

8.2 Working with Chemicals of Moderate Chronic or High Acute Toxicity (i.e., diisopropyl fluorophosphates, hydrofluoric acid, hydrogen cyanide; 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 Based on the toxicity of the chemical to be used, special ventilation may be required. The Chemical Hygiene Officer shall be contacted for consultation.

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.

8.3.3 Vacuum pumps must have scrubber 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 or lavage 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:

8.4.3.1 HEPA filtered vacuum equipment for cleaning;

8.4.3.2 Moisten contaminated bedding before removal from cage;

8.4.3.3 Mix diets in closed containers in hood.

8.4.4 Plastic or rubber gloves and fully buttoned lab coats will be worn in the animal room.

9.0 Emergencies on Campus

9.0.1 For all campus emergencies, Dial 9-1-1 or 8,9-1-1 from any campus phone. Cell phone users may also Dial 9-1-1 and tell the operator to connect you with CSU Police.

10.0 Recordkeeping

10.1 Accident investigations will be conducted by the laboratory supervisor/project director with assistance from other personnel as deemed necessary.

10.2 Accident reports will be submitted to the Director of Environmental Health and Safety as soon as possible following the accident/incident but not later than 48 hours.

10.3 Exposure records for hazardous chemicals and harmful physical agents will be maintained for 30 years per 29 CFR 1910.20.

- 10.4** Medical records for employees exposed to hazardous chemicals and harmful physical agents are confidential and will be maintained for the duration of employment plus 30 years per 29 CFR 1910.20 in accordance with patient privacy regulations.
- 10.5** Records of inspections of equipment will be maintained for the lifetime of the equipment.
- 10.6** Records of employee training will be maintained during an individuals period of employment, and retained for five years after employment.

11.0 Chemical Spills, Releases and Accidents

In the event of a chemical spill, release or accident, provisions set forth in the Cleveland State University Hazardous Waste Contingency Plan shall be implemented.

12.0 Annual Chemical Hygiene Plan Audit

The Chemical Hygiene Officer will conduct an audit of the Chemical Hygiene Plan on an annual basis. This review will include soliciting input from departmental chemical hygiene officers and affected personnel.

APPENDIX A

NEW CHEMICAL PURCHASING REQUEST FORM

NEW CHEMICAL PURCHASING REQUEST FORM

Date _____ Requestor _____

Dept _____ Proposed Location _____

Chemical Name _____

MSDS Attached Yes No

NOTE: MATERIAL SAFETY DATA SHEET REQUIRED FOR APPROVAL

Proposed Use _____

Engineering Controls Storage Requirements Personal Protective Equipmt

- | | | |
|--|--|--|
| <input type="checkbox"/> Fume Hood
<input type="checkbox"/> Canopy Hood
<input type="checkbox"/> Laminar Flow
<input type="checkbox"/> Other
_____ | <input type="checkbox"/> Flammable Cabinet
<input type="checkbox"/> Corrosive Cabinet
<input type="checkbox"/> Acid Cabinet
<input type="checkbox"/> Other
_____ | <input type="checkbox"/> Chemical Goggles
<input type="checkbox"/> Face Shield
<input type="checkbox"/> Overalls/Apron
<input type="checkbox"/> Gloves
Type _____
<input type="checkbox"/> Other
_____ |
|--|--|--|

Will Medical Surveillance be required? Yes No

If yes, indicate type _____

Comments: _____

Approved:

Department Chair or
Chemical Hygiene Officer

Paul M. Novak
University Chemical Hygiene Officer

APPENDIX B

Glove Compatibilities of Common Chemicals

APPENDIX C

Lab Inspection Form

Cleveland State University
 Department of Environmental Health and Safety
 Laboratory Inspection Form

Date _____ Building/Room _____ Dept. _____

I. Safety Equipment

<input type="checkbox"/> First Aid Kit Present	<input type="checkbox"/> Eyewash Station Present	<input type="checkbox"/> Emergency Shower Present	<input type="checkbox"/> Fire Extinguisher Present
<input type="checkbox"/> Stocked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Functioning	<input type="checkbox"/> Charged
<input type="checkbox"/> Inspected	<input type="checkbox"/> Inspected	<input type="checkbox"/> Inspected	<input type="checkbox"/> Inspected
			Type: _____

II. Personal Protective Equipment (Check all that apply)

<input type="checkbox"/> Goggles Present	<input type="checkbox"/> Face Shield Present	<input type="checkbox"/> Lab Coats Present	<input type="checkbox"/> Overalls/Aprons Present
<input type="checkbox"/> Gloves	Type: _____		
<input type="checkbox"/> PPE in use <input type="checkbox"/> PPE Not in use <input type="checkbox"/> Not Applicable: _____			

III. Laboratory Product Identification (Check all that apply)

<input type="checkbox"/> Chemical	<input type="checkbox"/> Biological/Infectious	<input type="checkbox"/> Radioactive	<input type="checkbox"/> Special Precautions for:
<input type="checkbox"/> Compressed Gas Tanks Present		<input type="checkbox"/> Compressed Gas Tanks Secured	
<input type="checkbox"/> Labeled Properly	Comments: _____		

IV. Product Storage

<input type="checkbox"/> Materials Stored Properly	<input type="checkbox"/> Chemical Safety Cabinets Present	<input type="checkbox"/> Materials Stored Improperly
Comments: _____	<input type="checkbox"/> Cabinets In Use	Comments: _____
Types: _____		
<input type="checkbox"/> Chemical containers leaking, bulging, rusting, etc...		<input type="checkbox"/> Excessive amounts of unused chemicals present

V. Waste Management

Type of Waste	Labeled Properly
<input type="checkbox"/> Hazardous	<input type="checkbox"/> Yes
<input type="checkbox"/> Biohazardous	<input type="checkbox"/> No
Proper Containers Used	<input type="checkbox"/> Yes <input type="checkbox"/> No

VI. Miscellaneous

<input type="checkbox"/> Fume Hood Operational _____
<input type="checkbox"/> Fume Hood Inspected
<input type="checkbox"/> Evidence of Eating Drinking Smoking <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> _____
<input type="checkbox"/> Lab Safety/Operating Procedures Posted
<input type="checkbox"/> Emergency Contact Information Posted

VII. Additional Comments:

Inspected by: _____
 Environmental Health & Safety Personnel

Date: _____

APPENDIX D

Safety Equipment Inspection Form

Cleveland State University
Laboratory Safety Equipment Inspection Form
(To Be Posted in Lab Near Equipment)

Department _____ Date _____
Building _____ Room Number _____

Eyewash Station: (Operational)

Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____

Fire Extinguisher (Charged):

Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____

Emergency Shower:

Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____

First Aid Kit:

Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____
Date _____	Personnel _____

APPENDIX E

Fume Hood Standard Operating Procedures

Cleveland State University
Department of Environmental Health & Safety

Standard Operating Procedures
For
Chemical Fume Hoods

Cleveland State University, in its efforts to provide for the health and safety of its employees, shall make every effort to ensure that chemical fume hoods are operating within acceptable industry standards. It will be the responsibility of the Department of Environmental Health & Safety (DEHS) to establish guidelines and to ensure the performance of all chemical fume hoods on campus is monitored. Any questions or concerns pertaining to the safe usage of chemical fume hoods should be directed to the Director of Environmental Health and Safety.

Acquisition and Installation of New Chemical Fume Hoods

Prior to the ordering of any new fume hoods on campus, departments will provide the manufacturer's specifications to DEHS and to Facilities' Environmental Operations Department. Upon approval from these departments, the unit(s) may be ordered. The installation shall be coordinated with both DEHS and Environmental Operations. Prior to use the unit will be tested by the installation contractor to ensure the unit is performing to industry standards and provide copies of certification to DEHS. No unit will be permitted to be used if it is not documented as functioning properly. Units which are not functional will be "tagged" as Out of Service, clearly indicating that it is not to be used as a chemical fume hood.

Definition of a Chemical Fume Hood

According to the American National Standards Institute and the American Industrial Hygiene Association (ANSI/AIHA), a chemical fume hood is defined as follows: "A chemical fume hood is a boxlike structure with one open side intended for placement on a table or bench.....The open side is provided with a sash or sashes that move vertically or horizontally to close the opening. Provisions are made for exhausting air from the top or back of the hood, and adjustable internal baffles are provided to obtain proper airflow distribution across the open face..."¹. Any unit that does not meet this definition is not considered a chemical fume hood and is not to be used with hazardous materials that specify the use of a chemical fume hood.

¹American National Standard for Laboratory Ventilation, published by the American Industrial Hygiene Association, ANSI/AIHA Z9.5-2003.

Indications for Using A Chemical Fume Hood

Use of a chemical fume hood is indicated when work performed creates the potential for an exposure to the chemicals/materials being utilized that is above Occupational Safety & Health Administration's (OSHA) permissible exposure limit (PEL) or the American Conference of Governmental Industrial Hygienist's (ACGIH) threshold limit value-time weighted average (TLV-TWA), whichever is the lowest. An adequately operating chemical fume hood, together with good laboratory work practices will keep exposure of employees/students to hazardous chemicals below the Permissible exposure limits of OSHA, and the threshold limit values of the ACGIH. If there is ever any doubt as to whether either of these exposure levels will be exceeded, the work should be performed in a properly functioning chemical fume hood.

General Work Practices for Chemical Fume Hoods

The following are work practices that must be adhered to by all employees/students if proper hood performance is to be achieved. They should be posted in each room containing a chemical fume hood:

1. Know the hazard characteristics of the chemical with which you are working. If you are not sure check the chemical's Material Safety Data Sheet (MSDS) or contact DEHS. Be sure to wear all personal protective equipment (e.g. safety goggles, lab coat, etc...). Chemical fume hoods are not intended to replace personal protective equipment.
2. Never lean into the hood as to allow your head to enter the plane of the hood face.
3. Do not allow equipment inside the hood to block airflow through the baffles.
4. Keep all materials inside the hood at least six (6) inches from the hood face.
5. Do not permanently store any chemicals, including flammable or combustible materials inside the hood; use only quantities which are necessary for performance of the days work, and return all flammable and combustible materials to approved storage cabinets.
6. Do not remove hood sash panels unless work to be performed does not involve any hazardous materials.
7. As much as is possible, keep the sash at a height so that the arrow on the sash meets the arrow on the frame. This is the height which provides optimum performance as reflected in testing by a certified testing contractor. Unattended experiments should be performed with the sash lowered.
8. Never use a chemical fume hood that has been "tagged" indicating that it is not functioning properly and is Out Of Service.
9. Any employee or student who feels that a hood is not functioning properly should not use the hood and report the problem to DEHS.
10. All hoods should be spot-checked by the user prior to performing any work by placing a sheet of paper at the face of the hood. Movement of the paper inward towards the hood interior is

an indication that the ventilation system to which the hood is attached is operational at the time.

11. If hood operation fails while experiments are in progress, seal all chemical containers in the hood and close sash. Notify Facilities Operations by calling Physical Plant Dispatch (X2500), or after hours by contacting Campus Police (X2020).

Chemical Fume Hood Testing

All chemical fume hoods on campus will be tested on a routine basis. These tests will be conducted by an outside contractor who has documented experience in ventilation, air quality, and hood testing and balancing. The specifications used in this testing will be developed by DEHS. The contractor upon completion will provide DEHS with a written report on each hood. Any hoods not meeting specifications will be “tagged” by the contractor as Out of Service.

Test Conditions

Hoods should be tested under the same conditions which they are actually used. Units should be emptied of all hazardous materials prior to testing and house only the supplies necessary for performance of the days’ experiments. If several hoods are located in one laboratory with a common exhaust, they should all be activated at least thirty (30) minutes prior to use in order to maximize performance and obtain accurate results.

Acceptable Performance Standards

Under ideal conditions, chemical fume hoods should operate with an average face velocity of one-hundred (100) linear feet per minute (LFPM) at a sash opening of eight (8) inches. However, if the sash opening is at eight (8) inches or greater, and the average face velocity is between eighty (80) to one-hundred sixty (160) LFPM, the hood performance shall be considered acceptable. Each hood shall be subjected to a “smoke-test”*

The average face velocity shall be determined by dividing the area face into between nine (9) and twelve (12) equal sections at a minimum sash height of eight (8) inches. Air velocity readings will be taken from each section and then the total number of readings obtained shall be averaged. The result shall be considered the average face velocity. The readings from each section of the hood face shall be within a twenty percent (20%) variability of one another.

All Vertical hood sashes shall be marked with arrows to indicate the sash height necessary to obtain the best face velocity. Labels shall be affixed to all fume hoods indicating the most recent date of performance testing.

*Procedure for Smoke Test : Smoke test will consist of igniting a smoke generating device designed and approved for hood testing inside each hood as close to the face as possible. Visual observations will be made to ensure that any

eddy currents present do not cause the smoke to escape beyond the face and into the breathing zone. Any unit that permits smoke to leave the hood interior shall be considered to have failed the smoke test and will be “tagged” Out of Service.

Hoods Found Not Functioning Properly

Any chemical fume hood found not to function in accordance with the above mentioned procedure will be brought to the attention of Environmental Operations via a work order. Each hood must demonstrate both an acceptable average face velocity and pass the smoke test in order to be considered functioning properly. If necessary, the hood or hoods in question will remain “tagged” Out of Service until the repairs or adjustments can be made. Upon completion, the hood shall be re-tested to verify proper performance.

Results of Testing

Results of testing are kept on file in both the DEHS and Environmental Operations. A summary of fume hood performance will be prepared by DEHS upon receipt of a written report. This summary will be forwarded to each respective department utilizing chemical fume hoods.

Hood Maintenance

The Facilities’ Environmental Operations Department is responsible for supervising and/or performing all maintenance and any modification connected with chemical fume hoods. They will notify each department of impending maintenance on their chemical fume hoods. All hazardous materials are to be removed and the hood decontaminated, if necessary, by each departmental user prior to any maintenance work being done. If the procedures require contact with parts that are unable to be decontaminated, then each worker shall utilize appropriate personal protective equipment (e.g. gloves, safety goggles, face shields, etc...). If an employee is unsure as to the type of personal protective equipment needed for a particular task, he/she should contact the Director of Environmental Health & Safety. Environmental Operations also performs preventive maintenance programs on a periodic basis to the hood ventilation system.

References

1. American National Standard for Laboratory Ventilation, ANSI/AIHA Z9.5 – 2003.
2. Laboratory Fume Hoods: A User's Manual, G. Thomas Saunders, 1993.

APPEDIX F

New Experiment Proposal Form

Cleveland State University

New Experiment Proposal Form

Requesting Individual: _____ Date _____

Department _____ Chairperson Authorization _____
(Must be signed to initiate review)

Experiment Name/Purpose: _____

Class Name/Course Code _____

Location (Building/Room#) _____

List Step by Step procedures to perform experiment: (Attach separate sheet if needed)

List all chemicals to be used:
(Attach MSDS Sheets if available)

- New Chemicals
- Existing Chemicals

Reviewed by: (Signature indicates approval)

Departmental Chemical
Hygiene Officer

Date

University Chemical Hygiene Officer

Date

APPENDIX G

University Incident Report Form

ARN# _____

Cleveland State University

Accident/Incident Report (Applicable for Employees, Students, Visitors)

Instructions for Report completion:

Complete the form in its entirety within 24 hours of the accident/incident occurrence and send to the Director of Environmental Health and Safety, Plant Services Building Room 210. Phone: (216) 687-9306 Fax (216) 687-9346. PLEASE PRINT ALL INFORMATION.

IMPORTANT: All CSU Employees must sign the form, and also obtain their supervisor's signature on the report form. Forward a copy of the completed form to Human Resources/Benefit Services, Keith Building 1300. Fax (216) 687-9334

Affected Individual's Relationship to CSU (Check one):

Employee Student Visitor

Individual Identification

1. Date/Time of Accident/Incident _____
2. Full Name _____ Date of Hire _____
3. Street Address _____
4. City/State/Zip Code _____
5. Home Phone Number _____
6. Work Phone Number _____
7. Social Security Number _____
8. Birthdate _____ 9. Date of Hire _____

CSU Employees Only:

Department _____ Campus Extension _____
Supervisor _____ Campus Extension _____
CSU ID# _____
Supervisor Signature _____

Accident/Incident Information

9. Location (Indoors – provide building/room # or area such as stairs, hallway etc.... Outdoors – describe area) _____

10. Was person performing regular job duties at the time of the accident/incident? **Yes** **No**

11. Did injury occur? **Yes** **No**

12. Did loss of property occur? **Yes** **No**

13. Please describe details of accident/incident:

14. What, if anything, could have been done to prevent this accident/incident?

15. If property damage occurred, please describe the loss as best as possible:

16. Were there any witnesses? Yes No

17. Name, address and phone number of witnesses (if applicable):

18. If injury occurred, please indicate the portion of the body that was injured:

- Left Right
- Hand Finger(s) Arm Elbow Wrist
- Shoulder Neck Face Teeth Eye(s)
- Foot Toe(s) Leg Knee Ankle
- Head Ear(s) Nose Throat Lungs
- Abdomen Groin Lwr Back Mid Back Upr Back

19. Type of injury (cut, sprain, exposure, bruise, burn, etc.)

20. Did the accident/incident involve a slip, trip, or fall? Yes No

21. Did the accident/incident involve lifting? Yes No

22. If lifting was involved, please indicate approximate weight of material being lifted, and how high it was lifted? _____

23. Is this type of work performed on a regular basis? Yes No

24. If injury occurred, did it appear immediately? Yes No

Information Regarding Medical Treatment/Missed Work Time

25. Were you treated by a physician? Yes No

If yes, Physician Name _____ Phone: _____

Date(s) of Treatment _____

26. Did you go to a hospital? Yes No

If yes, Hospital Name _____ Date _____
Hospital Phone _____

CSU EMPLOYEES: For medical attention, please contact the University Health Services (Fenn Tower 516) at x3649 for an appointment that day. If at all possible, the Health Services will address your need (but please do not just walk in). As an alternative, you may proceed to St. Vincent Charity Hospital Occupational Medicine Center (2322 East 22nd Street) during regular work hours for non-emergency matters. For emergency care, go to the St. Vincent Charity Hospital Emergency Room. Call 2020 for emergency transport.

27. Did you miss work? Yes No

CSU EMPLOYEES: Please call Benefits Services at 3636 for Assistance)

28. If injury occurred, is the injury an aggravation of an old injury? Yes No

Signature/Authorization

I certify that the information set forth above is true and correct to the best of my knowledge. By signing this form, I authorize any person(s) who did or who may hereafter provide medical attention, examination, or treatment, or who may possess information or knowledge which may be used to render a decision in my claim for injury/disease of _____ (date), to disclose such information or knowledge to my employer and/or to any other agency contracted by my employer to investigate this health claim.

Employee Name (Print)

Employee Signature (Sign)

Date _____

Revised February, 2005

APPENDIX H

Incident Investigation Form

Cleveland State University

Accident/Investigation Report

Name _____

- Employee
- Student
- Visitor

Department _____

Date/Time of Incident _____

Type of Injury/Illness _____

Body Parts Affected _____

Witnesses: Name/Phone _____

Specific Job being performed at time of accident/incident

Explain what exactly occurred (person's location, what he/she was doing, what occurrence resulted in accident/incident?)

What condition(s) existed, if any that may have resulted in the accident/incident?

Did Employee fail to perform an act that caused or contributed to the accident/incident? If yes, explain _____

What action(s) have been taken or will be taken in the future to prevent recurrence:

Person responsible for corrective action:

Proposed date of planned corrective action: _____

Supervisor's Name _____ **Date** _____

Signature _____

Department Head _____ **Date** _____

Signature _____

Director of Safety and Environmental Services _____ **Date** _____

February, 2005