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**Revision Responsibility:** Director of Facility Services and Safety

**Responsible Executive Officer:** Vice President for Financial & Administrative Services

**Source / Reference:** Occupational Safety and Health Administration (29 CFR 1910. 1450)

## **PURPOSE**

The purpose of this policy is to establish a Laboratory Chemical Hygiene Plan to ensure procedures, control measures, training, and medical evaluations are conducted in accordance with the Occupational Safety and Health Administration's (OSHA) standard entitled Occupational Exposure to Hazardous Chemicals in Laboratories, which will serve to provide a safe working environment for students, faculty, and staff.

Although the body of this document is not applicable to photographic chemical laboratory safety, [Form H](#) of this document serves to identify and document the safety requirements for working in a photographic dark room utilizing chemicals.

## **POLICY**

### **I. DEFINITIONS AND ACRONYMS**

**Action Level** - means a concentration designated by the Occupational Safety and Health Administration for a specific substance, calculated as an eight (8)-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

**CFR** – Code of Federal Regulations.

**CHP** – Chemical Hygiene Plan; a written program developed and implemented by Columbia State, which 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.

**DMSO** - Dimethyl sulfoxide; a by-product of the wood industry, has been in use as a commercial solvent since 1953.

**GHS** – Globally Harmonized System of Classification and Labelling of Chemicals; a system for standardizing and harmonizing the classification and labeling of chemicals.

**NFPA** – National Fire Protection Association; An organization promoting fire science and improving the methods of fire protection and prevention, electrical safety, and other related safety issues. Many of the performance criteria promulgated by the NFPA may be adopted by federal or local agencies.

**OSHA** – Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit; an exposure limit established and enforced by the Occupational Safety and Health Administration.

**pH** - a figure expressing the acidity or alkalinity of a solution on a logarithmic scale on which 7 is neutral, lower values are more acidic, and higher values more alkaline.

**PPE** – Personal Protective Equipment; specialized clothing or equipment worn by an employee for protection against a hazard.

**ppm** – parts per million.

**psi** – pounds per square inch.

**SDS** – Safety Data Sheet; means written or printed material concerning a hazardous chemical.

**SOP** – Standard Operating Procedure; a procedure established to ensure the safety of an operation being performed in a laboratory.

## II. GENERAL INFORMATION

The implementation of this Chemical Hygiene Plan provides employees with the information and training necessary to improve workplace safety and health, and to prevent chemical-related injuries and illnesses in laboratories. It provides greater worker protection to protect our students, employees and faculty. This plan is a complete and thorough documentation of laboratories of the College's right-to-know program and of the methods, practices, and information necessary to protect employees from the hazards of the chemicals in use in this facility.

## III. STANDARD OPERATING PROCEDURES [29 CFR §1910.1450(e)(3)(i)]

### A. General Policies

1. Students, faculty and staff shall follow this Chemical Hygiene Plan to promote their health and safety.
2. Students, faculty and staff shall follow the lab safety rules included as [Form A](#) of this Chemical Hygiene Plan. At the beginning of each semester, the instructor is required to present a lesson based on these rules and will require each student to read, sign, and submit the signed copy of this form to the instructor. The instructor is responsible for ensuring that all students have returned this form.

3. The design of the laboratory facility will provide sufficient space for safe work by the number of persons to be in the laboratory. Exit doors will be clearly marked and free of obstructions to permit quick, safe escape in an emergency.
4. Only students enrolled at Columbia State in the specific course may participate in laboratory exercises, except when superseded by College policy.
5. Laboratory facilities will be used only by persons with proper qualifications and training. The number of students assigned to the laboratory shall not exceed the number of laboratory stations available.
6. Employees are required to follow general precautions for handling all laboratory chemicals to minimize all chemical exposures. Specific guidelines found in the appropriate SDSs, are also required to be followed.
7. Employees shall not underestimate the risk of exposure, and exposure to hazardous substances shall be minimized. The decision to use a particular substance will be based on the best available knowledge of each chemical's particular hazard and the availability of proper handling facilities and equipment. Substitutions, either of chemicals or experiments, will be made where appropriate to reduce hazards without sacrificing instructional objectives. When the risk outweighs the benefit and no substitute is available, then the experiment, procedure, or chemical shall be eliminated.
8. Chemicals shall not be accepted from a supplier unless it is accompanied by the corresponding SDS, or an SDS from that supplier for that chemical is already on file. All SDSs shall be accessible to employees at all times.
9. Employees and students shall be trained to read and use the information found on SDSs.

**NOTE:** Generally, textbooks, laboratory manuals, and other instructional materials designate the safety precautions needed for a particular laboratory activity. However, total reliance on such publications to provide complete and accurate information is not advisable. Other sources of such information include but are not limited to publications and guidelines from professional and government organizations, as well as the training, experience and expertise of the lab instructors.

**B. Laboratory Procedures**

1. Faculty/Staff in laboratories:
  - a. All rules identified in [Form A](#) shall be followed at all times.

- b. Never pipette by mouth. Always use a bulb or other device for suction.
- c. Proper procedures for Bunsen burners or other sources of flame shall be followed. Never leave a flame unattended.
- d. Should a fire alarm or any other evacuation occur during a lab activity, turn off all Bunsen burners and electrical equipment. Leave the room as directed.
- e. The quantities of flammable liquids used in the laboratory shall not exceed the amount that can be consumed in the current experiment or process.

2. Students in the laboratory:

- a. Must read lab directions ahead of time and follow all verbal and written instructions.
- b. Shall perform only authorized experiments or procedures.
- c. Shall report all accidents, injuries, chemical spills, glass breakage or equipment malfunctions to the instructor at once, no matter how trivial they may seem.
- d. Shall only carry out laboratory work under the direct supervision of an instructor or designated staff member.

C. Hazard Specific Standard Operating Procedures

1. Standard Operating Procedures related to specific hazards can be found on [Form B](#), [Form C](#), [Form D](#), [Form E](#), [Form F](#), and [Form G](#) of this policy.
2. These procedures will be reviewed on an annual basis by the Chemical Hygiene Officer and the Director of Facility Services and Safety.

IV. CRITERIA TO DETERMINE AND IMPLEMENT CONTROL MEASURES [29 CFR §1910.1450(e)(3)(ii)]

The Laboratory Standard states that the CHP “.... shall include criteria that the employer will use to determine and implement control measures to reduce employee exposure to hazardous chemicals .....” Hazard controls are generally classified into three (3) broad groups: engineering controls, administrative procedures, and personal protective equipment. Guidance on control measures are delineated here.

A. General

1. The Chemical Hygiene Officer shall determine and implement appropriate control measures.
2. The Director of Facility Services and Safety shall be responsible for assisting the above in determining these control measures upon request. The Director of Facility Services and Safety may do periodic evaluations of control measures on campus as deemed necessary and notify the Chemical Hygiene Officer of their results and recommendations.

**B. Engineering Controls**

Engineering controls are considered the “first line of defense” in protecting workers. In contrast, Personal Protective Equipment (PPE) is generally considered the final defense. The Lab Standard requires that the general criteria for implementing control measures be described. The appropriate engineering control is often obvious, but the general criteria are noted here for the common ones. The criteria should be followed unless equivalent protection can be realized.

1. Fume Hoods, Wet Benches, Gas Cabinets & Other Exhaust Ventilation:
  - a) When using volatile substances that present a significant inhalation hazard;
  - b) When necessary to keep exposure levels below OSHA Permissible Exposure Limits;
  - c) When indicated in the SOP, or as indicated in SDSs.
2. Approved Hazardous Materials Storage Cabinets and Safety Cans:
  - a) Whenever possible, chemicals shall be stored in their approved hazardous material storage cabinets or approved safety cans;
  - b) Chemicals shall also be stored in approved hazardous material storage cabinets and safety cans when it is indicated in the SOP.

**C. Administrative Controls — Criteria for Implementation**

1. The controls instituted by a given laboratory shall be determined by the Chemical Hygiene Officer in consultation with the Director of Facility Services and Safety, as needed.
2. In general, measures shall be implemented:

- a) As indicated in the SOP;
- b) As mandated by health and safety regulations, or as called for by accepted good practice.

D. Personal Protective Equipment — Criteria for Implementation

1. Appropriate Personal Protective Equipment (PPE) practices are stipulated in this document.

V. REQUIREMENT THAT FUME HOODS AND OTHER PROTECTIVE EQUIPMENT ARE FUNCTIONING PROPERLY [29 CFR §1910.1450(e)(3)(iii)]

A. Fume Hoods

1. The minimum performance measure for a chemical fume hood that contains hazardous materials is 100 linear feet per minute averaged across the face with the sash set at 15 inches.
2. Ideally, no measurements should be plus or minus 20% of the average.
3. Hoods shall be tested upon installation, annually and upon request.
4. Hoods shall be tested by the Facility Services and Safety Office.
5. Chemical fume hoods shall be tested and tagged annually.

B. Emergency Showers & Eyewashes

Facilities shall check on a regular basis by running water through them until the water runs clear. They will repair as needed and keep records of such.

C. Fire Extinguishers

1. The Security Office shall check the fire extinguishers in the laboratory on a monthly basis.
2. All other maintenance to fire extinguishers is coordinated by the Facility Services Department in accordance with the procedures outlined in 29 CFR 1910.157.

D. Emergency Lights

1. Emergency lights shall be checked by the Security Office on a monthly basis.
2. The Facility Services Office shall conduct any required maintenance on the emergency lights as required.

VI. INFORMATION AND TRAINING [[29 CFR §1910.1450(e)(3)(iii) & 29 CFR §1910.1450(f)]

A. Training for Employees

1. The Chemical Hygiene Officer, in coordination with the Director of Facility Services and Safety, shall be responsible for providing employees with information and training to ensure that they are aware of the hazards of chemicals present in their work area.
2. The College will ensure that information and training is provided to the employee at the time of the employee's initial assignment to work in a laboratory where hazardous chemicals are present, and prior to assignments involving new exposure situations.
3. The information provided to the employee will include:
  - a) The contents of the occupational exposure to hazardous chemicals in laboratories standard 29 CFR§1910.1450.
  - b) The location and availability of this Chemical Hygiene Plan.
  - c) The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals.
  - d) Signs and symptoms associated with exposure to hazardous chemicals used in the lab.
  - e) The location and availability of known reference material on the hazards, safe handling, storage, and disposal of hazardous chemicals found in the laboratory, including but not limited to safety data sheets received from chemical suppliers.
4. The training provided to the employee will include:
  - a) Methods and observations that may be used to detect the presence or release of a hazardous chemical.



- b) The physical and health hazards of chemicals in the work area. This will include training in how to read and use the information found on SDSs.
- c) The measures employees can take to protect themselves from these hazards.
- d) The applicable details of this Chemical Hygiene Plan.

**B. Training for Students**

1. The Chemical Hygiene Officer, in coordination with the Director of Facility Services and Safety, will provide faculty with information and training for laboratory safety and student protocols.
2. The faculty member instructing the laboratory will ensure that safety precautions are reviewed at the beginning of each semester.
3. That faculty member will have each student review and sign the safety rules found in [Form A](#) of this Chemical Hygiene Plan.
4. The laboratory instructor will also review any specific safety protocols pertaining to each laboratory exercise prior to initiating that exercise. This will include training in how to read and use the information found on SDSs.

**VII. APPROVAL OF NEW LABORATORY OPERATIONS, PROCEDURES OR ACTIVITIES [29 CFR §1910.1450(e)(3)(v)]**

- A. Any requests for new laboratory operations, procedures, or activities or modifications to existing operations, procedures or activities must be addressed to the Chemical Hygiene Officer.
- B. The Chemical Hygiene Officer will review these requests and approve them following a review for safety.
- C. The Chemical Hygiene Officer may consult with the Director of Facility Services and Safety for an evaluation of procedures as needed.

**VIII. MEDICAL CONSULTATION AND MEDICAL EXAMINATIONS [29 CFR §1910.1450(e)(3)(vi)]**

- A. Medical consultation and examinations are the employees' right in certain circumstances, and we are committed to providing for such medical care for all employees affected by this standard. The College provides specific types of medical care under certain circumstances.



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- B. When an employee reports that they exhibit signs or experiences symptoms associated with exposure to a hazardous chemical used in the laboratory, the College will provide the employee with access to a licensed health care professional for evaluation.
- C. Any employee who is exposed routinely above the action level or, in the absence of an action level, above the PEL for an OSHA regulated substance for which there are exposure monitoring or medical surveillance requirements, has the opportunity for medical attention and evaluation.
- D. When an employee is present in the work area when a spill, leak, explosion, or other accident occurs that results in a potential significant exposure to a hazardous chemical, the College provides the employee with the opportunity for medical consultation.
- E. The College provides the physician or other licensed health care professional doing the medical evaluation or consultation the following required information:
1. The identity of the hazardous chemical,
  2. Conditions under which the exposure occurred, and
  3. A description of the signs and symptoms experienced by the worker.
- F. The College obtains the following required information from the physician or other licensed health care professional after medical evaluation or consultation:
1. Any written opinion for a recommended follow-up examination, medical exam, and the attendant test results;
  2. Any detected medical conditions of the employee that might pose increased risk; and
  3. A statement that the employee was informed of the medical examination/consultation results.
- G. When required by regulation, the College establishes and maintains for each employee an accurate record of exposure monitoring results and any medical consultation and examinations, including tests or physician medical opinions, in accordance with OSHA's rule governing access to employee exposure and medical records, 29 CFR 1910.1020.

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- IX. DESIGNATION OF PERSONNEL RESPONSIBLE FOR IMPLEMENTATION [29 CFR §1910.1450(e)(3)(vii)]
- A. The Lead Faculty for Chemistry has been designated by the College to serve as the position of Chemical Hygiene Officer.
  - B. The Director of Facility Services and Safety provides assistance to this Chemical Hygiene Officer in the implementation of this plan.
- X. PROVISIONS FOR WORK WITH PARTICULARLY HAZARDOUS SUBSTANCES [29 CFR §1910.1450(e)(3)(viii)]
- A. At the current time, Columbia State does not utilize any chemicals that would fall into any of the categories, which would trigger the implementation of these procedures.
  - B. This will be revisited if any chemicals meeting this criteria are introduced.
- XI. EVALUATION OF THE EFFECTIVENESS OF THIS PLAN [29 CFR §1910.1450(e)(4)]
- A. The Director of Facility Services in conjunction with the Chemical Hygiene Officer will annually review the performance of this Chemical Hygiene Plan.
  - B. This evaluation will be submitted to the President during the month of May of each year.

*February 16, 2016; reviewed/accepted by Cabinet, approved/signed by the President February 2022.*