Occupational Exposure to Hazardous Chemicals in Laboratories

District Name: Copper Mountain Community College District

Facility Name: Copper Mountain College

Prepared By: Richard Treece

Last Review Date: _____

Review Dates:_____,

The person with responsibility to administer and authority to implement this plan is Richard Treece, Supervisor Maintenance and Operations; rtreece@cmccd.edu; (760) 366-3791 x5295.

In accordance with the Cal-OSHA Title 8, Section 5191, the following Occupational Exposure to Hazardous Chemicals in Laboratories plan has been developed:

I. Introduction

1) Public and private schools over the past few years have had to comply with various Hazard Communication or "Right to Know" laws. These laws were written for industrial production facilities, and did not address the specific safety concerns found in a laboratory setting.

2) In 1991, the California Occupational Safety and Health Administration (Cal-OSHA) instituted "The Laboratory Standard" - Occupational Exposure to Hazardous Chemicals in Laboratories. This new "Laboratory Standard" has been designed to address the specific safety needs of the laboratory.

3) The Laboratory Standard ensures that employees who work in a laboratory setting will be protected from any chemical exposure that exceeds permissible exposure limits and that employees be educated as to the hazardous nature of the chemicals they use in the laboratory.

4) To achieve this goal, the Laboratory Standard requires the District to appoint a Chemical Hygiene Officer to develop, implement, and monitor a Chemical Hygiene plan.

II. District Responsibilities

1) The Board of Trustees and the District President/ Superintendent have ultimate responsibility to ensure the institution complies with the Laboratory Standard. Several of these tasks are:

2) Record all employee exposures to hazardous chemicals.

a) Record all chemical exposures and use monitoring instruments to get hard data. Obtain and keep up-to-date information provided by a medical examination.

b) Keep these records and allow employee access to these records, including all employee exposure and medical records.

3) NOTE: Do not get alarmed. This provision is included in the Lab Standard, but clearly states you only have to monitor exposure levels if you know you routinely have an exposure level which is above the permissible exposure limit (PEL) and a Cal-OSHA Standard exists for the chemical, which requires monitoring. If you have no reason to believe you have exceeded a PEL, you do not have to monitor exposure levels.

4) Train employees to:

a) Understand the hazards of chemicals they use in the laboratory.

b) Recognize signs and symptoms associated with overexposure to hazardous chemicals.

c) Properly use personal protective equipment (fume hoods, respirators, goggles, etc.).

d) Protect themselves from chemical exposure by following good laboratory procedures.

e) Understand the content of the Chemical Hygiene Plan.

5) Provide access for all employees to:

a) MSDSs (Material Safety Data Sheets).

b) Previous exposure records (if any).

c) Previous medical records (if any).

d) The Laboratory Standard and Chemical Hygiene Plan.

e) Permissible exposure limits for hazardous chemicals used in the laboratory. (Consult your Flinn Chemical Catalog/Reference Manual)

6) Upon receipt of chemicals:

a) Make sure you have the MSDS (and make them accessible to the employee).

b) Make sure the label is proper and contains the minimum amount of information.

VI) Chemical name.

VII) Hazard information.

VIII) Name and address of the manufacturer.

7) Note: You must follow these steps for all chemicals and chemical solutions made and stored in your laboratory or chemical storeroom.

III.The Chemical Hygiene Plan - An Overview

1) The Chemical Hygiene Plan is the major ingredient of the Laboratory Standard. Our school district should develop and carry out a written Chemical Hygiene Plan which is capable of:

a) Protecting employees from health hazards associated with hazardous chemicals in the laboratory.

b) Keeping chemical exposures below established permissible exposure limits. (Consult your Flinn Chemical Catalog/Reference Manual for specific chemical permissible exposure limits.)

2) The Chemical Hygiene Plan must be readily available to employees. The school district shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update it as necessary. The Chemical Hygiene Plan should include each of the following elements and should include specific measures we will take to ensure laboratory employee protection.

IV.Standard Operating Procedures

1) General Employee Rules and Procedures.

2) General Laboratory Rules and Procedures.

3) Personal Hygiene Guidelines.

4) Protective Clothing Requirements.

5) Housekeeping Rules.

6) Spill and Accident Procedures.

7) Chemical Storage Rules and Procedures.

8) Compresses Gas Handling Instructions.

9) Flammable Chemical Handling Instructions.

10) Corrosive Material Handling Instructions.

11) Procedure - Specific Safety Rules and Guidelines (Including Severely Toxic and Carcinogenic Substances).

12) Prior Approval Required Procedures

13) Safety Equipment Inspection (every 3 months - minimum)

V. Employee Training.

1) Exposure Evaluations.

2) Medical Evaluations

3) Monitoring

4) Emergency Evacuation Plan.

5) Reprint of The Laboratory Standard.

VI. Chemical Hygiene Plan

1) Standard Operating Procedures

   a) General Employee Rules and Procedures

   b) Minimize all chemical exposures.

   c) Skin contact with chemicals should be avoided.

   d) Avoid underestimation of chemical hazards and risks.

   e) Wear appropriate eye protection at all times. Chemical splash goggles must be worn any time chemicals, glassware or heat are used in the laboratory.

   f) Never work alone in the laboratory, chemical storage or prep areas.

   g) Flammable liquids require special attention. Never use these materials near any source of ignition, spark or open flame.

   h) Never perform a first-time chemical demonstration in front of your class. Always perform first-time demonstrations in front of other instructors to evaluate the safety of the demonstration. Safety shields will be used when appropriate.

i) Never store chemicals over, under or near a sink.

j) Only authorized personnel are allowed in the chemical storeroom.

k) Have a fire blanket easily accessible in case of an accident.

l) Train all students on how to use all safety devices in the laboratory (e.g., eyewash, fire extinguisher, etc.) and teach all students and employees to find the safety devices quickly in an emergency.

m) Know appropriate procedure in the event of a power failure.

n) Know where and how to use master utility controls to shut off gas, electrical and water supplies.

o) Do not smell or taste chemicals.

p) Use a safety shield whenever an explosion or implosion might occur.

q) Read all chemical labels prior to use.

r) Know and understand the hazards of the chemical as stated in the MSDS and other references.

s) Use protective safety equipment to reduce potential exposure (e.g., gloves, respirators, fume hood, etc.).

t) Know the locations for all personal safety and emergency equipment, eye wash, shower, fire extinguisher and spill control materials.

u) Know how to properly store all chemicals in their compatible chemical categories.

v) Know proper transportation and disposal procedures for chemicals.

w) Know appropriate emergency procedures, waste disposal, spill clean up, evacuation routes and fire emergency notification.

x) Know and understand the personal hygiene practices outlined in the Chemical Hygiene Plan.

y) General Laboratory Rules and Procedures

2) The first aid policy and procedures should be in writing.

3) The laboratory should be well ventilated (a minimum of 4 room changes per hour is recommended).

    a) Air for laboratory ventilation should flow directly into the laboratory from non-laboratory areas and out to the exterior of the building. Chemical storage areas should be ventilated separately from general ventilation systems.

4) Post emergency telephone numbers in the chemical storage area.

    a) Have a telephone or some means of emergency communication in the laboratory, chemical storage area and prep area.

5) Do not use chipped, etched or cracked glassware.

    a) Glassware that is chipped or scratched presents a serious breakage hazard when heated or handled.

6) All laboratories must have an eyewash station capable of flushing both eyes continuously for 15 minutes with copious quantities of potable water.

    a) Teach everyone how to use the eyewash in case of an emergency. Eyewash stations must be accessible within 10 seconds of the potential exposure area.

    b) A deluge shower may be required if the body is also exposed to corrosive substances.

    c) Both eyewash and deluge stations must be activated and inspected monthly.

7) In the event of an accident, fill out a student accident report describing the event in detail.

8) Read all labels carefully.

9) Do not operate electrical equipment with wet hands.

    a) Potentially wet areas should be equipped with electrical outlets that are ground fault circuit interrupter protected.

10) Have appropriate types and sizes of fire extinguishers.

    a) A Class D fire extinguisher (for metals) should be available when working with flammable solids.

    b) All fire extinguishers should be inspected monthly and serviced annually.

11) Do not block fire exits.

12) Have an alternative evacuation route in the event your primary route becomes blocked.

13) Practice your emergency plans.

14) Do not drink from lab glassware or other lab vessels.

15) No food in the laboratory. Do not eat, drink or chew gum in the laboratory.

16) Do not apply cosmetics in areas where laboratory chemicals are present.

17) Keep all aisles clear.

18) Do not run in the laboratory.

19) No unlabeled products should be stored anywhere in the science facility.

20) Be thoroughly familiar with the hazards and precautions for protection before using any chemical. Study the precautionary label and review its contents before using any chemical substance.

21) A fire blanket should be available for all laboratory areas.

22) Neutralizing chemicals and a spill kit, dry sand, kitty litter, and other spill control materials should be readily available.

23) Dispose of all chemicals properly. All disposal procedures used should conform to state and local regulations.

24) Promptly repair any eyewash station, deluge shower or body drench hose, which does not meet the water, flow requirements of ANSI Z358.1.

25) Access to exits, emergency equipment and master utility controls should never be blocked.

26) All accidents or near misses should be carefully analyzed with the results distributed to management.

27) Never pipette by mouth.

28) Avoid the use of contact lenses in the laboratory. If contact lenses must be worn, the science teacher must be informed so special precautions can be taken.

29) Never perform unauthorized laboratory experiments.

VII. Personal Hygiene Guidelines

1) Do not apply cosmetics or smoke, eat, chew gum or drink in the laboratory.

2) Do not pipette by mouth - always use a pipette bulb or other appropriate suction device.

3) Wash thoroughly after any chemical exposure or before leaving the laboratory.

4) Never smell chemicals directly

5) Never bring food, opened or closed, into the lab, chemical prep or storage area. Food should not be eaten in rooms, which store toxic materials.

VIII. Protective Clothing Requirements

1) Eye protection must be worn.

    a) Chemical splash goggles should be worn when employees and students are potentially exposed to injurious substances while any impact-resistant safety glasses must meet the ANSI Z87.1 Standard.

    b) Wear face shields when dealing with corrosive liquids that pose a risk to the face and neck area.

2) Wear gloves that offer protection for all hazards you may find in the lab. Test for holes each time you wear your gloves.

3) Always wear a full-length lab coat or a chemical-resistant apron.

4) Appropriate footwear should be worn in the laboratory setting.

5) Slip-resistant soles are recommended. No open-toed footwear should be allowed.

6) Determine whether respiratory protection is needed by reviewing the MSDS and discussing the potential chemical hazards with the Chemical Hygiene Officer.

7) Never block access to emergency exits or equipment.

8) Clean up all spills properly and promptly.

9) Do not wear shorts.

10) Do not wear loose or balloon sleeves.

11) Tie back long hair.

12) Avoid the use of contact lenses in the laboratory. Goggles can be fitted over prescription eyewear.

13) Do not wear dangling jewelry.

14) Do not wear a long or loose necktie.

15) Do not wear an absorbent watch strap.

16) Inspect all protective safety equipment before use. If defective, do not use.

IX. Housekeeping Rules

1) Keep chemicals in the chemical prep and storage area.

2) If chemicals are moved to the classroom for lab, they must be returned to their proper storage location at the end of the day's laboratory periods.

3) Waste materials require proper containers and labels.

4) Do not store items in the fume hood.

5) The storage of items in the fume hood is a fire hazard and decreases the efficiency of the fume hood.

6) Label all chemicals and solutions properly.

7) Never block access to exits or emergency equipment.

8) Clean up all spills properly and promptly.

9) Work and floor surfaces should be cleaned regularly and kept free of clutter.

X. Spill and Accident Procedures

1) Notify - Call for help. Evacuate - Get everyone to a safe location.

2) Assemble - Organize the students and all employees. Report - Complete a written report of the incident.

3) Clean up spills immediately and thoroughly.

4) Follow approved spill cleanup procedures. Spills should only be cleaned up by trained personnel.

5) A bucket of dry sand should be available as a Class D fire extinguisher and to aid in providing traction on a slippery floor.

6) Neutralizer for both acid and base spills should be available in the event of a chemical spill.

XI. Chemical Storage Rules and Procedures

1) Keep an updated paper-copy or computerized inventory of all chemicals, their amounts and location.

2) Stored chemicals should be examined annually for replacement, deterioration and chemical integrity.

3) All chemicals should be reviewed for their shelf life and disposed of as appropriate per Education Code 49411.

4) Label all chemical solutions you make with the identity of the contents, date, concentration, hazard information and your name.

5) Date label all chemicals with the purchase date. This will allow anyone to determine the age of a substance at a later date.

6) Establish a separate and secure storage area for chemicals.

7) Do not allow incoming shipments of chemicals to be opened and transported by school personnel other than qualified science teachers.

8) The special and expensive shipping containers used are frequently discarded and would prove valuable for chemical storage.

9) All chemicals should be stored in chemically compatible categories.

10) Store the minimum amount of chemicals needed.

11) Store corrosives in an appropriate corrosives storage cabinet.

12) No flammable materials should be stored outside an approved flammables storage cabinet unless in safety cans.

13) Do not store chemicals in a fume hood.

14) If possible, keep certain items in the original shipping package (e.g., acids and bases) in the special Styrofoam cubes.

15) Avoid storing chemicals on shelves above eye level.

16) The storage area and cabinets should be labeled as to identify the hazardous nature of the products stored within. This will allow fire department officials to quickly see a potentially hazardous area.

17) Shelving above any work area, such as a sink, should be free of chemicals or other materials.

18) Shelving sections should be secured to walls or floor to prevent tipping of entire sections.

19) Shelves should be equipped with barriers to prevent containers from rolling off.

20) Chemicals should not be stored on the floor except in approved shipping containers.

21) Storage area should be ventilated by at least four changes of air per hour.

22) Isolate the chemical storage exhaust from the general building ventilation system.

23) Never store food in a laboratory refrigerator.

24) Store chemicals in a separate and locked, dedicated storeroom.

25) Store all poisons in a locked cabinet.

26) Only authorized personnel are allowed in the chemical storage area.

    a) Students should never be allowed in this area.

27) Chemicals should not be exposed to heat or direct sunlight.

XII. Storage Requirements - Compressed Gas Handling Instructions

1) Compressed gases should be handled as high-energy sources, and therefore, as potential explosives.

2) Always protect the cylinder valve stem.

3) Avoid exposure of cylinders to heat. Do not store gas cylinders in direct sunlight.

4) Never lubricate, modify, force or tamper with a cylinder valve.

5) Cylinders of toxic, flammable or reactive gases should be used only under a fume hood.

6) Do not extinguish a flame involving a combustible gas until the gas is shut off - otherwise it can re-ignite, possibly causing an explosion.

7) Gas cylinders must be secured in place.

    a) They must be protected to prevent valve damage, which may be caused by falling.

XIII. Storage Requirements - Flammable Chemicals

1) Store all flammables in a dedicated flammables cabinet.

2) Keep cool, between 55ºF and 80ºF, at all times.

3) Store away from all sources of ignition.

4) Store away from all oxidizers.

5) Never store flammables in refrigerators unless the refrigerator is explosion-proof.

6) Avoid storing any chemicals, especially flammable materials, in direct sunlight.

XIV. Storage Requirements - Corrosive Materials

1) Store corrosives in appropriate corrosives storage cabinet.

2) If possible, keep certain items in the original shipping package (e.g., acids and bases) in the special Styrofoam cubes.

3) Working with corrosive materials requires special eyewear.

4) Wear a chemical splash face shield and goggles when handling corrosive materials.

5) At least every three months inspect all shelf clips in your acid cabinet to check for possible corrosion.

    a) These shelf clips are the only thing between you and a collapsed shelf.

    b) They require special attention.

XV. Procedure Specific Safety Rules and Guidelines (For extremely hazardous chemicals)

1) Use a fume hood when the permissible exposure limit for a chemical is less than 50 ppm as indicated on the chemical MSDS.

2) Use carcinogens, mutagens, teratogens and allergens only under a fume hood.

3) Handle toxic, corrosive, flammable and noxious chemicals under a fume hood.

4) Do not expose flammable liquids to open flame, sparks, heat or any source of ignition.

5) Only use flammable solids (sodium, lithium, etc.) in very small quantities. Use a safety shield when igniting flammable solids.

6) Water-reactive solids (sodium metal, etc.) should be stored under oil.

7) Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air.

8) Open cans of ether (e.g., ethyl ether) should be properly disposed of after use and not stored unless absolutely necessary. Rely on expiration date to dispose of the material.

9) Glycerin should be available only to the instructor.

XVI. Prior Approval Procedures

1) There may be some procedures which require prior approval before an instructor attempts to perform them.

2) These procedures must be determined by cooperation and communication between the Science Department and the Chemical Hygiene Officer.

XVII. Safety Equipment Inspection

1) There are many safety items necessary for compliance with the Laboratory Standard.

2) They include, but are not limited to:

    a) Eyewash Stations and Deluge Showers.

    b) Fire extinguishers.

    c) Goggles.

    d) Respirators.

3) The Laboratory Safety Standard stipulates that all equipment must be operational at all times and, additionally:

4) Goggles must always be clean and functional.

5) Laboratory ventilation must meet the standard of eight air changes per hour and must be tested quarterly.

6) A respirator must be fit-tested and the appropriate cartridges must be available.

7) Fire extinguishers must be of the right type and be inspected monthly.

8) Eyewash stations and deluge showers must be functional and flushed at least once a month.

9) Fume hoods must be operational with a flow rate of 70-100 linear feet per minute as measured by a velometer.

    a) Fume hoods must be inspected annually by certified personnel.

10) All of the above items and all safety equipment must be inspected every three months at a minimum.

11) Any safety equipment failing this quarterly inspection or reported to be out of order at any time must be repaired immediately.

12) Any safety equipment found to be out of order is a violation of the Laboratory Standard.

XVIII. Employee Training

1) Copper Mountain Community College District provides ongoing training sessions for our employees. Our training includes:

    a) Content and location of this Chemical Hygiene Plan and The Laboratory Standard.

    b) Potential hazards involved in using chemicals.

    c) Signs and symptoms of overexposure to chemicals. How to detect potentially harmful exposures before they are harmful.

    d) Location and availability of chemical Material Safety Data Sheets (MSDS).

    e) Understanding of the permissible exposure limits (PELs) used in the school.

    f) The proper use and location of all safety equipment.

XIX. Exposure Evaluation

1) It is the communicated policy of Copper Mountain Community College District to investigate all suspected overexposures to chemicals in a prompt and timely fashion.

2) In the event of an overexposure, after the immediate event, we must document all chemicals and circumstances involved in the overexposure.

3) This information should be used to change safety practices to further improve lab safety.

4) It is our obligation to maintain these files and make them accessible to the employees.

5) Signs of overexposure are numerous and may include:

    a) Accidental breakage of a hazardous material container.

    b) A skin rash or irritation occurring because of contact with a chemical.

    c) Caustic splash to eyes, face or body.

    d) Symptoms such as nausea, dizziness and others.

6) If monitoring of the air is determined to be necessary, the results of the monitoring must be made available to the affected employees (within 2 weeks).

XX. Medical Evaluations

1) It is the policy of Copper Mountain Community College District to make medical consultation and examination available to our employees when:

    a) Any sign or symptom of an overexposure to a chemical is present.

    b) Monitoring has indicated an overexposure to a chemical has occurred.

    c) There has been a spill or uncontrolled release of chemical fumes.

2) We will provide the physician with names of the chemicals used, circumstances of the exposure and all signs and symptoms of the exposure.

3) The medical examinations dealing with the overexposure must be documented and other employees working under the same conditions must be notified.

4) All documentation must be kept on file and accessible to other employees working in this area.

5) All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay.

XXI. Monitoring

1) Monitoring will be necessary for substances regulated by a standard only if there is reason to believe that exposure levels for that substance routinely exceed the PEL for that substance.

2) If there is no cause to suspect a hazard or an exposure, no monitoring is necessary.

3) If monitoring is performed and this initial monitoring shows no evidence of exposure, the monitoring may be discontinued.

4) If initial monitoring indicates an exposure, steps must be taken immediately to reduce the exposure.

5) Monitoring must then be performed periodically to verify that the steps to reduce the exposure have been effective.

6) Monitoring may be terminated after complying with the applicable standard for the hazardous chemical.

7) All monitoring results and activities shall be fully accessible and in full knowledge of the employee(s).

XXII. Emergency Evacuation Plan

1) Establish a chain of communication.

2) Notification of response personnel must be completed before proceeding to handle the immediate situation.

3) Evacuation may be necessary depending on the incident.

4) Once it has been determined that evacuation is necessary, all personnel will proceed in an orderly fashion as you would in a fire drill evacuation.

5) Personnel will be sent to a pre-designated area with a head count conducted to make sure everyone is out of the building.

XXIII. Copper Mountain Community College District Emergency Evacuation Plan

(Attach copy of school site or district emergency evacuation plan)

The following are the names, titles and positions of all department members who participated in the Occupational Exposure to Hazardous Chemicals in Laboratories review and contributed to the report:

_____	_____
Richard Treece, Supervisor Maintenance and Operations	Date
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	Date

Dates of submission and review(s)

_____	_____
Richard Treece, Supervisor Maintenance and Operations	Date of Submission
_____	_____
Chief Business Officer	Date of review
_____	_____
President/ Superintendent	Date of review
_____	_____
I.P.C.	Date of review