

University of New Mexico  
Health Science Center  
Draft Chemical Hygiene Plan

and

Laboratory Specific Information  
Template

UNMHSC Chemical Safety Committee  
Approved 1/26/2017

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# Laboratory Specific Information

The following information specific to the laboratories covered by this plan as listed on the front page, is provided to augment the UNMHSC Chemical Hygiene Plan. This laboratory adopts the UNMHSC Chemical Hygiene Plan and its concepts, and the specific information for the laboratory(ies) covered by this plan are below.

Laboratory Name: \_\_\_\_\_

This Chemical Hygiene Plan applies to these specific laboratories (give locations):

List of Reviewers (Name/Signature/Phone #):

Name (Print),

Signature

Phone No.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date: \_\_\_\_\_

Laboratory Safety Coordinator for the laboratory is: \_\_\_\_\_.

Phone No: \_\_\_\_\_

Email address: \_\_\_\_\_

### Particularly Hazardous Substance List

The following list is a list of all particularly hazardous substances used in the laboratory(ies). This is a list of all carcinogens, mutagens, teratogens, reproductive toxins, pyrophorics, dangerous-when-wet, peroxide forming, or having a high degree of acute toxicity (See attachment)

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## Standard Operating Procedures (SOPs)

The following is a list of SOPs which involve hazardous materials or hazardous processes, which have an assessment of the hazards and their controls either attached to the SOP or posted in areas where the process is performed, for easy access. An SOP can be for a process, for a particular class of hazardous materials, or for a particularly hazardous substance. All processes involving chemicals must document the hazards and appropriate controls and emergency procedures for these processes. A Job Hazard Analysis (JHA) form is attached, for documenting hazards, and controls, by task.

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## Training

Training required by those working in the laboratory include:

1. Hazard Communications 2012
2. Chemical Hygiene Plan
3. Chemical Spill Clean-up
4. Waste Management
5. Safe Chemical Storage
6. SOPs to be used in the laboratory (including hazards and controls)
7. Laboratory Safety Practices (Security, PPE required when in the lab, etc.)
8. Lab-specific safety education will be conducted by the laboratory at least annually to ensure that researchers know the hazards and hazard mitigation plans of the specialized techniques specific to their own research. These trainings must be documented.

Add any others that may apply (Sharps handling and storage, biohazards, bloodborne pathogens, radiation licensing requirements, radioactive waste, mixed waste, Particularly Hazardous Substance practices, PPE, respiratory protection training, others?)

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### Laboratory Safety Data Sheets (SDS) Location

Indicate where the SDS are maintained (location electronically or where the paper copy can be found):

### Spill Clean-up Kit Inventory and Procedure

The location and contents of spill clean-up kits are listed below, and spill clean-up procedures are attached (for general spill clean-up procedures and information on spill kits, contact Safety and Risk Services or visit the website: <http://srs.unm.edu/chemical-safety/> )



## Laboratory Self-Audit and Incident Reports

Attached are copies of self-audit reports conducted for this laboratory, and incident reports for spills or releases (other than incidental spills).

# DEFINITIONS

**Action level** – A concentration designated by OSHA 29 CFR 1910 for a specific substance, calculated as an 8-hour time weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

**Article** – A manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use functions(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

**Authorized Chemical Worker** – UNM faculty, staff, student, or visitor whose manager or supervisor has determined that he/she has the training, knowledge, skill, and abilities to safely perform the chemical work to which he/she is assigned.

**Carcinogen** – Any substance or mixture of substances that meets one of the following criteria:

- It is regulated by OSHA as a carcinogen; or
- It is listed under the category "known to be carcinogens", in Annual Report on Carcinogens by the National Toxicology Program (NTP) (latest ed., <http://ntp.niehs.nih.gov/?objectid=72016262-BDB7-CEBA-FA60E922B18C2540>); or
- It is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (Vol. 1-48 and Supplements 1-8); or
- It is listed in either Group 2A or 2B by IARC (<http://monographs.iarc.fr/>) or under the category, "reasonably anticipated to be carcinogens" by NTP (<http://ntp.niehs.nih.gov/?objectid=72016262-BDB7-CEBA-FA60E922B18C2540>) and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:
  - After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m<sup>3</sup>;
  - After repeated skin application of less than 300 mg/kg of body weight per week; or
  - After oral dosages of less than 50 mg/kg of body weight per day
- A mixture shall be classified as a carcinogen when at least one ingredient has been classified as a carcinogen and is present at or above 0.1%.

**Chemical** – Any element, compound, or mixture of elements and compounds.

**Chemical Hygiene Officer (CHO)** – A UNM employee designated by his/her management who is qualified, either by education, training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. A designated CHO will take the Safety and Risk Services Chemical Safety train-the-trainer course.

**Chemical Safety Committee (CSC):** A committee of faculty and staff members for the purpose of:

- Monitoring research chemical safety and hygiene issues in the Health Sciences Center and facilitating compliance with all regulatory agencies having jurisdiction.
- Assuring functionality of interactive chemical inventory.
- Facilitating the availability of rare chemicals through inventory process.
- Communicating guidance on chemical issues with investigators and research staff.
- Identifying chemical safety training issues and opportunities.
- Receiving chemical safety reports from Safety and Risk Services and HSC Safety personnel.
- Monitoring emerging chemical safety issues.  
Reviewing the Chemical Safety Charter biannually and making recommendations for revisions to the Executive Vice Chancellor and Vice Chancellor for Research. It is comprised of representatives from the School of Medicine, College of Pharmacy, Office of Research, Safety and Risk Services, and HSC Safety personnel. In the future, if faculty in the College of Nursing use chemicals for a research protocol, the college will have a representative appointed to the committee.

**Container** – Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. Pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

**Corrosive** – A chemical that causes visible destruction or permanent changes in human skin tissue at the site of contact.

**Chemical Owner** – An authorized chemical worker assigned ownership and responsibility for a chemical container in the chemical inventory system.

**Designated area** – An area that shall be established and posted for work with particularly hazardous substances and to which access is administratively restricted to authorized personnel. A designated area may be the entire laboratory, an area of a laboratory, or a device such as a laboratory fume hood. Designated area signs are available from Safety and Risk Services at 277-2753.

**Emergency** – Any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

**Globally Harmonized System (GHS)** – OSHA revised its Hazard Communications standard in 2012 to bring it into harmony with the International Hazard Communication Standards promulgated by the United Nations. This requires a standardization of labeling, formats for Safety data Sheets (SDS), reporting, and other hazard communications between suppliers and users world-wide.

**Hazardous chemical** – Any chemical which is classified by OSHA (1910.1200) as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified. If a hazardous chemical comprises 1% (0.1% for carcinogens) or greater of a compound or mixture, the compound or mixture will be treated as a hazardous chemical.

**Hazardous Waste** – Is defined by EPA as “(A) liquid, solid, contained gas, or sludge waste that contain properties that are dangerous or potentially harmful to human health or the environment”. EPA further defines hazardous waste as:

- Waste exhibiting at least one of four characteristics: ignitability, corrosivity, reactivity, or toxicity; or
- Waste appearing in one of the EPA lists (hazardous or acutely hazardous chemicals that have been used, or not, but no longer usable for its intended purpose).

For a more detailed definition, go to <[www.epa.gov](http://www.epa.gov)>

**Health Hazard** – A chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in Appendix A to 29 CFR 1910.1200–Health Hazard Criteria.

**High Acute Toxicity** – Substances that may be fatal or cause clinical damage to target organs as a result of a single exposure of short duration. High acute toxicity chemicals meet the following criteria: a Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV) of less than 0.1 ppm Time-Weighted Average (TWA) or ceiling limit of less than 1.0 ppm.

**Immediate use** – The hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it was transferred,

**Laboratory** – A workplace where relatively small quantities of hazardous chemicals are used on a non-production basis, chemical manipulations are carried out on a “laboratory scale”, and multiple chemical procedures or chemicals are used.

**Laboratory scale** – Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

**Medical consultation** – Consultation which takes place between a licensed physician and an employee [or student] for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

**Must** – Designates a contractual or policy requirement or a regulatory mandate.

**Mutagen** – A chemical that causes permanent changes in the amount or structure of the genetic material in a cell. Chemicals classified as mutagens in accordance with the Hazard Communication Standard (29 CFR 1910.1200) shall be considered mutagens for purposes of this section.

**Occupational Exposure Limit (OEL)** – Occupational Exposure Limit values are set by competent national authorities or other relevant national institutions as limits for concentrations of hazardous compounds in workplace air. For purposes of this document, the applicable OELs are OSHA PELs and ACGIH Threshold Limit Values (see definitions below).

**Particularly hazardous substances** – Particularly hazardous substances (PHS) are those chemicals with special acute or chronic toxicity. The OSHA Laboratory Standard defines a PHS as being a select carcinogen, reproductive toxin, or having a high degree of acute toxicity. In the Laboratory Standard, OSHA does not provide a list of PHSs because new chemicals are continually being developed and tested in laboratories. The OSHA Laboratory Standard requires areas where PHS materials are used to be designated with signage, and SOPs for use of chemicals that are PHSs (see p. 35 for PHS SOPs)

**Permissible Exposure Limit (PEL)** – The maximum 8-hour time-weighted average concentration, or short-term exposure limit, of an airborne contaminant that shall not be exceeded under OSHA standards.

**Physical hazard** – A chemical that is classified as posing one of the following hazardous effects: Explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid, or gas); self-reactive; pyrophoric (gas, liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; in contact with water emits flammable gas; or combustible dust. The criteria for determining whether a chemical is classified as a physical hazard are in Appendix B of the Hazard Communication Standard (29 CFR 1910.1200).

**Professional Visitor** – An individual with advanced science, engineering or related education, experienced working independently in a similar laboratory, and will be temporarily working independently in a UNM laboratory.

**Safety Data Sheet (previously known as Material Safety Data Sheet)** – Written printed, or electronically transmitted document concerning a hazardous chemical that is prepared in accordance with paragraph (g) of 29 CFR 1910.1200.

**Standard Operating Procedure (SOP)** – Documented procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals (OSHA 1910.1450)

**Reproductive toxins** - Chemicals that affect the reproductive capabilities including adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on the development of the offspring. Chemicals classified as reproductive toxins in accordance with the Hazard Communication Standard (29 CFR 1910.1200) shall be considered reproductive toxins for purposes of this section. The [Proposition 65](#) list developed by the State of California is one source of information about chemicals known to cause birth defects or other reproductive harm.

**Secondary container** – Any chemical container other than an original container that will be used to store decanted chemicals or mixed chemicals beyond a single workday. (*Note:* This definition should not be confused with secondary containment for chemical release prevention control.)

**Shall** – Designates a UNM policy or regulatory mandate.

**Should** – Designates a recommendation contained in the regulations or a recommendation from a recognized industry standard.

**Threshold Limit Values (TLVs)** – Threshold Limit Values, which are established by the American Conference of Governmental Industrial Hygienists (ACGIH), refer to airborne concentrations of chemical substances and represent conditions under which it is believed that *nearly all* workers may be repeatedly exposed, day after day, over a

working lifetime, without adverse health effects. These include: 8-hour time-weighted averages (TLV–TWAs), short-term 15-minute time-weighted averages (TLV–STELs), and ceiling limits (TLV–Cs).

**Threshold Limit Value—Time–Weighted Average (TLV–TWA)** – The time-weighted average concentration that should not be exceeded for a conventional 8-hour workday and a 40-hour workweek.

**Threshold Limit Value—Short-Term Exposure Limit (TLV–STEL)** – A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the 8-hour TWA is within the TLV–TWA.

**Threshold Limit Value—Ceiling (TLV–C)** – The concentration that should not be exceeded during any part of the working exposure.

**Will** – Designates a UNM policy or standard practice or regulatory mandate.

# PURPOSE

This written document is designed to protect University of New Mexico (UNM) faculty, staff, professional visitors, students, and visitors from potential health hazards associated with the handling, use, storage, and disposal of hazardous chemicals. This document serves as the UNM Health Sciences Center (HSC) written Chemical Hygiene Plan (CHP), and addresses the requirements of the OSHA “Lab Standard” (OSHA, 29 CFR 1910.1450, [Occupational Exposure to Hazardous Chemicals in Laboratories](#)).

As stated in UNM Policy: **“The ultimate responsibility for safety, however, cannot be delegated as a staff function, it must be assumed by every member of the University community (emphasis added)”** [UNM Administrative Policies and Procedures Manual – Policy 6110: Safety and Risk Services Department]. This document is a broad overview of the information necessary to protect laboratory workers potentially exposed to hazardous chemicals. In addition to this plan document, laboratories must develop and follow a laboratory specific operating procedure. SOP formats are discussed in detail on page 24 of this plan. Activities that involve hazardous chemicals that have unusual characteristics or whose hazards are not adequately covered in this document must address these specific hazards and their mitigation in their laboratory specific operating procedure. The HSC Chemical Hygiene Plan will be reviewed annually by the HSC Chemical Safety Committee.

## PLAN DESCRIPTION

This plan addresses the five major elements of the Laboratory Standard:

- Hazard identification
- Chemical Hygiene Plan
- Information and training
- Exposure monitoring
- Medical consultation and examinations

It also addresses the following topical areas:

- Regulatory Requirements
- Responsibilities
- Worker Information and Training
- Standard Operating Procedures (SOPs)
- Chemical Procurement
- Chemical Inventory
- Safety Data Sheets (SDSs), previously known as MSDSs



- Chemical Labels
- Hazardous Chemical Storage
- Hazardous Chemical Transportation
- Chemical Exposure Control
- Chemical Exposure Assessment
- Medical Consultation
- Medical Surveillance
- Laboratory Audits
- Hazardous Chemical Spills and Accidents
- Hazardous Waste Disposal

## SCOPE

This plan applies to all UNMHSC facilities where hazardous chemicals are procured, acquired, manufactured, handled, received, distributed, transported, used, stored, recycled, neutralized, or disposed of and all individuals who work in these areas. Exceptions to, or deviations from, this plan must be approved by the UNMHSC Executive Vice Chancellor and Vice Chancellor for Research.

### **Material Exemptions**

The following materials are exempted from the OSHA Lab Standard and, therefore, do not fall under the scope of this written Chemical Hygiene Plan:

- Articles;
- Hazardous Waste;
- Any hazardous substance that is the focus of remedial or removal action being conducted under Comprehensive Environmental Response Compensation and Liability Act in accordance with U.S. Environmental Protection Agency regulations;
- Tobacco or tobacco products (refer to UNMHSC Smoke-[Free](#) Environment Policy);
- Wood or wood products, including lumber which will not be processed, where the only hazard they pose to workers is the potential for flammability or combustibility;
- Food or alcoholic beverages that are sold, used, or prepared in a retail establishment, intended for personal consumption by workers while in the workplace;
- Any drug, when it is in solid, final form for direct administration to a patient (e.g., tablets or pills) intended for personal consumption by employees while in the workplace (e.g., first aid supplies);
- Cosmetics intended for personal consumption by workers in the workplace;

- Consumer products used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, where the use results in a duration and frequency of exposure that could reasonably be experienced by consumers when used for the purpose intended;
- Laboratory uses of hazardous chemicals which provide no potential for employee exposure such as chemically-impregnated test strips (e.g. clinical dipsticks) or commercially prepared diagnostic kits in which all of the reagents needed to conduct the test are contained in the kit;
- Biological agents;
- Ionizing radiation; and
- Nonionizing radiation.

## REGULATORY REQUIREMENTS

The regulatory requirements for the policies, procedures, and work practices outlined in this Chemical Hygiene Plan include:

- [OSHA 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories](#)
- [OSHA 29 CFR 1910.1200, Hazard Communication](#)
- [OSHA 29 CFR 1910.132, Personal Protective Equipment](#)
- [OSHA 29 CFR 1910.133, Eye and Face Protection](#)
- [OSHA 29 CFR 1910.134, Respiratory Protection](#)
- [OSHA 29 CFR 1910.138, Hand Protection](#)

## RESPONSIBILITIES

THE EXECUTIVE VICE-CHANCELLOR AND VICE CHANCELLOR FOR RESEARCH, is responsible for:

- ensuring that departments/centers/units engaged in the use of hazardous chemicals comply with the UNMHSC Chemical Hygiene Program;

DEANS, DEPARTMENT CHAIRS AND CENTER DIRECTORS are responsible for:

- Ensuring departmental compliance with the UNMHSC Chemical Hygiene Plan
- Providing the Laboratory Directors or Principal Investigators with the support necessary to implement and maintain the CHP; and

- Ensuring that safety audit findings are resolved in a timely manner
- Ensuring safety issues and concerns are communicated to UNM SRS

**THE UNMHSC CHEMICAL SAFETY COMMITTEE (CSC)** is responsible for:

- Approving the overall format of the UNMHSC Chemical Hygiene Plan;
- Reviewing and suggesting changes to the Chemical Hygiene Plan annually, and
- Advising the Executive Vice Chancellor and Vice Chancellor for Research on chemical and laboratory safety issues
- Communicating chemical safety concepts within their organizations

**THE SAFETY AND RISK SERVICES DEPARTMENT** is responsible for:

- Developing a UNMHSC Chemical and laboratory inspection plan and schedule;
- Developing a uniform chemical inventory system accessible by all UNMHSC laboratories;
- Developing and providing training and training materials applicable to campus wide requirements;
- Assisting departments and laboratories with tailored training in their areas as needed;
- Conducting exposure assessments and evaluating exposure control measures;
- Providing or coordinating emergency response for hazardous chemical spills;
- Investigating hazardous chemical incidents and accidents;
- Coordinating chemical and laboratory safety reports from Chemical Hygiene Officers and other UNMHSC personnel with the HSC Executive Research Operations Officer;
- Conducting annual laboratory safety inspections, chemical safety audits and facilitating compliance with all regulatory agencies having jurisdiction on UNMHSC campus. These inspections should be carried out in the presence of laboratory researchers during routine operations. Reports will be sent to the PI requesting a response indicating that the corrections were made. A follow up inspection will then be conducted to verify compliance.
- Reporting chemical and laboratory safety non-compliance issues to the Vice Chancellor for Research and the Executive Research Operations Officer;
- Reporting to the CSC trends in laboratory compliance and safety. Developing and maintaining chemical safety self-audit forms; and
- Performing an annual evaluation of the Chemical Hygiene Plan, for regulatory compliance, for consideration by the CSC.

**Chemical Hygiene OFFICER (CHO's)** or their designee is responsible for:

- Working with administrators, faculty, and staff to develop and implement appropriate chemical safety policies and procedures for the work areas to which she/he has been assigned;
- Monitoring hazardous chemical and laboratory safety issues in their laboratory;
- Communicating guidance on chemical and laboratory safety with faculty investigators and research staff;
- Providing area-specific chemical safety training and information for procedures, protocols, and the Chemical Hygiene Plan for the laboratory to faculty, staff, and students prior to their performing laboratory operations with hazardous chemicals, with SRS providing lab specific training assistance as requested.
- Notifying Safety and Risk Services if a new risk assessment is required (introduction of a new chemical risk, change in engineering controls that could impact laboratory worker exposure, significant changes in quantities or processes);
- Facilitating completion of the chemical inventory and SDS's for the work areas to which he/she has been assigned;
- Coordinating the development of the Chemical Hygiene Plan(s) for the laboratories she/he is assigned to assist; and
- Coordinating an annual evaluation of the laboratory specific Chemical Hygiene Plan(s);

#### LABORATORY DIRECTORS/PRINCIPAL INVESTIGATORS/DESIGNATED LAB SAFETY OFFICER ARE RESPONSIBLE FOR:

- The overall responsibility for health and safety in the laboratory;
- Ensuring that workers know and follow the chemical hygiene rules, that protective equipment is available and in working order, and that appropriate training has been provided including how to don, doff, adjust, wear and dispose of PPE.
- Monitoring procurement, use and disposal of chemicals used in the work areas to which he/she has been assigned;
- Providing regular chemical hygiene and housekeeping inspections including routine inspections of emergency equipment;
- Knowing the current legal requirements concerning regulated substances;
- Determining the required levels of personal protective apparel and equipment;
- Ensuring chemical safety self-audits are conducted for the work areas to which she/he has been assigned;
- Ensuring that facilities and training for use of any material being ordered are adequate;
- Notifying Safety and Risk Services to arrange for environmental monitoring evaluation when appropriate or when research involves highly hazardous chemicals or procedures.
- Being present for questions during laboratory inspections and for the exit interview.

# INFORMATION AND TRAINING

UNMHSC shall provide information and training to inform all workers and students of the physical and health hazards of the hazardous chemicals in their work area. The information and training must be provided to the worker or student at the time of her/his initial assignment to work involving the use of hazardous chemicals, prior to assignments involving new exposure situations, and upon changes in the procedures and/or chemicals that present new hazards in the work area. Also, annual refresher training on the Chemical Hygiene Plan is required for all laboratory employees and students. Training shall be documented in Learning Central.

Basic chemical safety training will include the following information:

- The location of the OSHA Standards: [29 Code of Federal Regulations \(CFR\) 1910.1450](#), *Occupational Exposure to Hazardous Chemicals in Laboratories*, as well as [29 Code of Federal Regulations \(CFR\) 1910.1200](#), *Hazard Communication*; and how they can access the standards;
- Explanation of UNM's Chemical Hygiene Plan including labeling system, SDSs, and how employees can obtain chemical hazard information, including information on occupational exposure limits;
- A description of the various methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area;
- General guidance on the selection of protective measures to reduce chemical exposure
- Information on safety resources; and
- General emergency procedures to be used in the event of accidental exposure to hazardous chemicals, including emergency phone numbers, and emergency evacuation procedures.

In addition to general chemical safety training, workers and students must be provided with area-specific training and information. This training will include:

- The specific physical and health hazards of chemicals used in their work areas, including signs and symptoms of exposure;
- The specific protective measures required when using the chemicals in their work area;
- The specific methods and observations that may be used to detect the presence or release of a hazardous chemical in their work area;

- The location of eye washes and safety showers, and how to use in the event of a chemical exposure; and
- Training on the applicable details of the Chemical Hygiene Plan relevant to their laboratory.

## STANDARD OPERATING PROCEDURES

Before beginning any work involving hazardous chemicals, Standard Operating Procedures (SOPs) will be developed by the PI/laboratory supervisor for procedures in which hazardous chemicals are used, or for each hazard class used in the laboratory. All SOPs must have a Job Hazard Analysis (JHA), which identifies the task(s), the hazard for each task, and the controls (engineering controls, administrative controls, PPE controls). In addition, all SOP's must contain a section on emergency procedures. A JHA form, attached to this document, can be attached to any SOP, for ease of review by all who use the SOP. An SOP may be one of three different types. These are:

- Hazardous chemical: the SOP is specific to an individual chemical such as nitric acid or ethylene oxide. (Recommended for OSHA designated Particularly Hazardous Substances);
- Process: the SOP will be for a process such as distillation, synthesis, etc.; or
- Hazard class: the SOP will be for a hazard class of chemicals such as oxidizer, flammable, corrosive, etc.

The choice of SOP type and the number of SOPs is left to the discretion of the PI/laboratory supervisor. For an uncomplicated, routine activity involving very few materials a process SOP may be adequate while an activity involving multiple chemicals might be best addressed using a combination of process and hazard class SOPs. In the case of OSHA designated Particularly Hazardous Substances, it is recommended that a separate SOP be written that specifically addresses the PHS.

In the case of an OSHA designated Particularly Hazardous Substance, laboratory-specific standard operating procedures must include the following requirements where appropriate:

- Establishment of a designated area;
- Use of containment devices such as fume hoods or glove boxes;
- Other mandatory controls including PPE appropriate to the hazard;
- Procedures for safe removal of contaminated waste; and
- Decontamination procedures.
- Stop work protocols require the researcher or PI to cease all work involving a highly hazardous chemical or process in the event of a near miss or otherwise observed highly unsafe situation. Anybody directly or indirectly involved or observing the Near Miss event should be empowered to call for a stop work protocol; this extends from an

undergraduate student to the PI. Stop work may extend beyond the lab to the entire facility with similar operations.

The laboratory supervisor, with SRS's assistance, as needed, will determine what engineering controls and personal protective equipment are necessary for each SOP. The SOPs will be included as part of the laboratory-specific Chemical Hygiene Plan.

# CHEMICAL HAZARD MANAGEMENT

## CHEMICAL PROCUREMENT

Chemicals shall be purchased using one of the following methods:

1. Through the UNM-SRS implemented Enterprise Reagent Management (ERM) system, using a UNM issued Purchase Card (P card). ERM is a web-based chemical inventory management system and links with LoboMart which hosts catalogs for different chemical vendors;
2. By purchase requisition through the Chemical and Research Laboratory Suppliers (CRLS) office;
3. By walk-in to CRLS for purchases;
4. Directly from a vendor outside of ERM using a P-Card or Purchase Order, provided the purchased chemical is immediately barcoded and entered into ERM by the purchaser, upon delivery. Contact SRS for barcodes.

UNM-SRS has implemented a web-based inventory program: [Enterprise Reagent Manager \(ERM\)](#), which links with links with LoboMart which hosts catalogs for different chemical vendors. Authorized users can access the [ERM system if they are on a computer hard-wired into a UNM server](#). For ERM access and training, please contact SRS. Inventory records require the name of the chemical, CAS number, building and room number, size and number of containers, and, must be entered into the ERM chemical inventory management system. When hazardous chemicals are donated to an activity, they must be included in the activity's chemical inventory.

Before a decision is made to acquire a chemical, the purchaser will determine whether:

- A Safety Data Sheet is available;
- The proposed quantity is an appropriate amount for the activity;
- There is a less hazardous or non-hazardous chemical available;
- There is a surplus chemical available from another chemical owner, if appropriate; and
- Information and facilities are available for safe disposal of hazardous waste generated by that chemical's use



## CHEMICAL INVENTORY

All chemicals shall be purchased using one of the methods listed above. Chemical purchases shall comply with the Purchasing Department's Hazardous Chemicals and Radioactive Materials Purchasing & Tracking Program.

UNM laboratories are required to maintain an inventory of all hazardous chemicals known to be present using a product identifier that is referenced on the appropriate Safety Data Sheet. Each laboratory is responsible for maintaining their own inventory for all chemicals present in their lab. UNM-SRS has implemented a web-based inventory program: Enterprise Reagent Manager (ERM) which links with an acquisition program of Chemical and Research Laboratory Supplier (CRLS) program. SRS will provide initial inventory entry into ERM, upon request by the laboratory, which will then be maintained by the laboratory personnel.

## SAFETY DATA SHEETS (SDS's)

Safety Data Sheets (SDS's) (formerly MSDS's or Material Safety Data Sheets) are required for all chemicals located in the laboratory, including those that are produced, received from a distributor or importer. When an SDS is not available the chemical owner is responsible for preparing an SDS. Contact the organizational Chemical Hygiene Officer or Safety and Risk Services at 277-2753 for assistance in developing SDS.

Work area supervisors shall ensure that workers and students have access to Safety Data Sheets for all hazardous chemicals used in their work area in accordance with the applicable requirements in [29 Code of Federal Regulations \(CFR\) 1910.1200](#), *Hazard Communication* and [29 Code of Federal Regulations \(CFR\) 1910.1450](#), *Occupational Exposure to Hazardous Chemicals in Laboratories*. SDS's must be readily accessible to laboratory worker and students during each work shift when they are in their work area(s). Work area supervisors must also ensure that employees and students review the SDS prior to initially working with the chemical.

## LABELS

Each hazardous chemical container in the workplace shall be labeled in accordance with [29 Code of Federal Regulations \(CFR\) 1910.1200](#), *Hazard Communication*. Chemicals shipped prior to June 1, 2015 must be labeled either in accordance with HazCom 1994 or the 2012 revised standard. HazCom 1994 requires that each hazardous chemical container in the workplace shall be labeled, tagged or marked to provide:

- The identity of the hazardous chemical;

- Appropriate hazard warning information for worker protection (physical and health hazards); and
- The name and address of the chemical manufacturer, importer, or other responsible party.

All hazardous chemicals, beginning June 1, 2015, must be labeled in accordance with the new OSHA Hazard Communication standard, known as the Globally Harmonized System (GHS), as outlined in the OSHA HazCom standard modifications of 2012. This standard requires each hazardous chemical container in the workplace be labeled, tagged or marked to provide:

- Product identifier;
- Signal word;
- Hazard statement(s);
- Pictogram(s);
- Precautionary statement(s); and
- The name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

For further explanation of the labeling components, including pictograms and signal words, go to: < <https://www.osha.gov/dsg/hazcom/index.html> >.

Exceptions to this requirement are:

- Signs, placards, process sheets, batch tickets, operating procedures or other such written materials may be used in lieu of affixing labels on individual stationary process containers as long as the alternative method identifies the containers to which it is applicable and conveys the information required to be on the label.
- Portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use (i.e., during the work shift) of the worker who performs the transfer need not be labeled. However, if the container is left unattended for any period of time, a label is required that includes the name of the chemical, date created, and the owner of the container.
- Solid metal (such as a beam or a metal casting), solid wood, or plastic items that are not exempted as articles due to their downstream use, have signs, placards, operating procedures, or other such written materials used in lieu of affixing labels to individual items and are only used as long as the alternative method identifies the material to which it is applicable and conveys the required above information.

- Drugs which are dispensed by a pharmacy to a health care provider for direct administration to a patient.

Portable, secondary or other in-house workplace containers must be labeled with all of the required information that is on the label from the chemical manufacturer or, the product identifier and words, pictures, symbols or a combination thereof which provide specific information regarding the hazards of the chemical.

Alternative labeling systems such as National Fire Protection Association (NFPA) diamonds or the Hazardous Material Information System (HMIS) are allowed for workplace labels as long as they are consistent with the 2012 revised HazCom Standard (e.g. no conflicting hazard warnings or pictograms).

Labels shall be maintained in legible condition and are not to be removed or defaced, unless the container is immediately marked with the required information. Any container without a label should be reported to the supervisor immediately.

All pipes and piping that contains hazardous contents must be labeled in accordance with UNM's policy. An SDS will be maintained for hazardous materials piped, and the same name will be on the label, in an easily readable size and location, as is on the commensurate SDS. Sufficient hazmat pipe labeling will be applied so that the piping contents will be easily identifiable by someone that may impact or perform maintenance/modification on the line. Contact Safety and Risk Services for more details.

Containers into which chemical waste are being accumulated must be labeled "Hazardous Waste" and specify the chemical content, and the date the first waste accumulation in the container began. For more information on hazardous waste management contact Safety and Risk Services.

## CHEMICAL STORAGE

Storage includes all chemical phases and all types of containers including, but not limited to, tanks, piping, cylinders, and containers of solid, liquid, or gaseous chemicals. Storage includes all chemicals or chemical products, including used and unused chemicals, sealed, opened, or partially filled containers, working solutions, day-use containers, and chemical "residues" left within tanks, piping, or other containers. Storage in this document excludes storage of solid waste or hazardous waste.

All chemicals will be stored by hazard class and incompatible chemicals will be segregated to prevent accidental contact with one another. Chemical storage will be limited to the quantity necessary to perform the work, and within safe limits. Liquid hazardous chemicals in laboratories should be stored so that a spill will not exceed 20 L (5 gallons), as required by NFPA

45, *Standard on Fire Protection for Laboratories Using Chemicals*. Flammable and combustible liquids will be limited to less than the maximum quantities allowed in Table 10.1.1 of NFPA 45 (See Attachment).

Refrigerators and freezers used for storing flammable liquids must be specifically designed (e.g. explosion proof, laboratory safe) for that purpose. All chemical storage refrigerators shall only be used for storing chemicals, never food or drink. These refrigerators are to be labeled “NO FOOD OR DRINK TO BE STORED IN THIS REFRIGERATOR,” or similar wording.

Containers of materials that might become hazardous during prolonged storage (i.e. peroxide forming chemicals) will be dated when first opened. At the end of six months after opening, the material will be evaluated or tested for continued safe use. For a list of peroxide forming chemicals and testing methods go to:

<https://louisville.edu/dehs/waste/peroxide%20forming%20chemicals.pdf>.

Materials that are found to be safe or that can be stabilized to be made safe will be permitted to be re-dated and retained for an additional 6-month period, or according to manufacturer’s instructions, whichever is more stringent. All other material will be safely and compliantly discarded.

For more information on storage of chemicals contact Safety and Risk Services.

All compressed gas cylinders, whether in use or in storage, empty or full, shall be secured by a chain or other effective fastening device preventing the cylinder from falling over. Never use Teflon tape on straight thread connections such as CGA as this might actually make the connection leak. Ensure that all tubing conducting the gas is appropriate and will not itself react with the gas. Users of compressed gas cylinders must comply with the requirements for safe use and storage of Compressed Gas Cylinders. Contact Safety and Risk Services for further information.

## TRANSPORTATION

If a hazardous chemical is produced in a UNM laboratory for another user outside of the laboratory, or if any hazardous chemical is shipped over public roads from the laboratory, the chemical owner will provide labels and SDS’s that meet OSHA and Department of Transportation (DOT) requirements.

On-site and off-site transportation of chemicals will be done in accordance with DOT and EPA requirements. Transportation refers to movement of chemicals within and between buildings,

on-site vehicular movement of chemicals on non-public roads, and both on-site and off-site vehicular movement of chemicals on public roads.

### **On-Site Transportation**

Hazardous chemicals that are transported between stockrooms and laboratories must be done using break-resistant secondary containment, such as commercially available bottle carriers, large enough to hold the contents of the chemical container(s) in the event of breakage. Heavy or multiple containers should be moved using laboratory carts and freight-only elevators should be used when available. On-site movements via vehicle must be done in a UNM vehicle, with a list of the hazardous materials by hazard class and quantity inside the vehicle. Hazardous materials must be secondarily contained, not in the cab of the vehicle (or in space that is contiguous with the cab), and secured against movement while the vehicle is in motion.

Compressed gas cylinder handling shall be with a suitable hand truck, secured by straps or chains, and the valve protected with a cover cap or a protection designed cylinder (as in the case of a Dewar). Dragging, sliding, or rolling of cylinders should be avoided.

### **Off-Site Transportation and Shipment**

The transportation and shipment of hazardous chemicals and compressed gases is strictly regulated by international, federal, and state agencies including the Department of Transportation (DOT) and the International Civil Aviation Organization (ICAO). Only specially trained persons are allowed to prepare and/or ship these materials. The shipment of hazardous materials by untrained persons is illegal and violators are subject to criminal penalties. UNM employees who prepare and package hazardous material for shipment, or sign hazardous materials manifests and shipping papers must be trained and hold a current certification by the training institution. Personnel who wish to ship or transport hazardous chemicals or compressed gases off-campus must contact Safety and Risk Services at 277-2753.

## **CHEMICAL EXPOSURE CONTROL**

### **Hierarchy of Controls**

A hierarchy of control methods should be used to ensure that any chemical exposures do not exceed OSHA Permissible Exposure Limits (PELs) or other established occupational exposure limits (OELs) when an appropriate PEL does not exist. The hierarchy of controls prioritizes intervention strategies based on the premise that the best way to control a hazard is to

systematically remove it from the worker's environment, rather than relying on employees to reduce their exposure. The types of measures that should be used to protect employees (listed from most effective to least effective) are: elimination/substitution, engineering controls, administrative controls, work practices, and personal protective equipment. Engineering controls, such as chemical fume hoods, physically separate the employee from the hazard. Administrative controls, such as operating procedures and training, minimize or eliminate hazards by controlling work practices. Personal protective equipment and clothing provide additional protection when an exposure is either unavoidable or there is a likelihood of an inadvertent exposure. The hierarchy of controls should be implemented in the following order:

- Elimination/substitution whenever feasible
- Engineering controls, whenever feasible
- Administrative controls whenever engineering controls are not feasible or do not achieve full compliance and administrative controls are practical
- Personal protective equipment, including respiratory protection, during:
  - the time period necessary to install or implement feasible engineering controls
  - when engineering and administrative controls fail to achieve full compliance
  - in emergencies

### **Elimination/Substitution**

Elimination of a hazardous chemical or substitution of a hazardous chemical with a less hazardous chemical is the preferred method to control chemical hazards. Whenever possible, personnel will consider eliminating hazardous chemicals, substituting less hazardous chemicals, and minimizing the amount of chemicals required for a hazardous chemical activity. In addition to reducing potential personnel exposures, these measures limit UNM's environmental impact of the University and support UNM's waste minimization or pollution prevention efforts.

### **Engineering Controls**

#### **Laboratory Ventilation**

All work with chemicals should be performed so that personal exposures to hazardous chemicals, and the potential for vapor or dust explosion is minimized. The best way to accomplish this is by using Local Exhaust Ventilation (LEV) systems such as chemical fume hoods, snorkels, down draft tables, glove boxes and toxic gas cabinets. Chemical fume hoods are most often the primary control device used when working with flammable and/or toxic chemicals. Chemical fume hoods or other suitable engineering controls should be used when

working with all hazardous substances and must be used for all work with OSHA designated particularly hazardous substances.

## Chemical Fume Hood Certification

Hood certifications will be conducted on every fume hood annually, thereafter, or whenever a significant change has been made in its use or location. Chemical Fume Hood certification is determined by several factors, including the average face velocity, the overall condition of the hood, the types and quantities of chemicals used in the hood. **SRS standards require all chemical fume hoods to maintain an average face velocity that is adequate to provide containment. Such face velocities typically range from 80-125 fpm at a sash height of 18 inches.** Evaluations will include the quality of the structure, the installation, air flow patterns, and use of the hood. These evaluations and certifications will be conducted by qualified SRS personnel or an SRS-approved third party vendor.

A certification sticker will be placed on all hoods that meet SRS standards. The sticker will be placed on the side of the hood with an arrow that shows the maximum safe operating sash height.

If the hood does not pass the certification, it will be labeled with a red "DO NOT USE" sticker. The hood is not certified for use and may be unsafe. These hoods receive priority maintenance. PPD will notify SRS when the hood is repaired and SRS will re-evaluate the hood prior to employee use.

Ductless fume hoods will only be used for operations that could be performed on an open bench without presenting an exposure hazard. These hoods require prior approval from the CHO before use to ensure that personal exposures are below occupational exposure limits. Lab owners must check with the manufacturer of the hood to ensure that they have the appropriate filter installed for their application and the required frequency for replacing the filter. Filter changes will be documented.

For additional guidance and requirements governing the design, installation, maintenance and use of chemical fume hoods and other LEV systems, contact Safety and Risk Services.

### ADMINISTRATIVE CONTROLS

Administrative controls include policies and procedures. They are not as reliable as engineering controls in that the user has to carefully follow procedures and must be fully trained and aware to do so.

While general guidance regarding laboratory work with chemicals is contained in this plan, before beginning any work involving hazardous chemicals, SOPs will be developed for each laboratory by the PI/laboratory supervisor. In many cases, a general standard operating

procedure can be created for a group of laboratories that have similar chemical hazards and operations. During the development of the SOP, the Safety Data Sheet (SDS) for each hazardous chemical that will be addressed in the SOP should be referenced. The SDS contains important information such as exposure limits, type of toxicity, warning properties, signs and symptoms of exposure, and recommended PPE. If an SDS is not available for a new chemical that will be produced, and the toxicity is unknown, the chemical should be considered a Particularly Hazardous Substance.

The PI/laboratory supervisor, with SRS's assistance, will determine what engineering controls and personal protective equipment are necessary for each SOP. The SOP's will be included as part of the laboratory-specific Chemical Hygiene Plan. The Principal Investigator and all personnel responsible for performing the procedures detailed in the SOP shall sign the SOP acknowledging the contents, requirements and responsibilities outlined in the SOP. The SOP's shall be reviewed and shall be amended when warranted due to changes in chemicals, conditions, methods, or equipment. For certain hazardous chemicals, PHS, or specialized practices, consideration must be given to whether additional consultation with safety professionals is warranted or required.

Circumstances requiring prior approval from the PI/Laboratory Supervisor will also be addressed in protocols and/or SOP's.

### **Personal Protective Equipment (PPE)**

Lab requirements for PPE must be specified by the PI/laboratory supervisor, based on an evaluation of potential hazards. The minimum required PPE for laboratory chemical operations includes:

- safety glasses with side shields,
- protective gloves,
- a laboratory coat,
- closed-toe shoes, and
- long pants or other clothing that covers the legs.

Flame resistant laboratory coats are required for pyrophorics, and flammables. Based on a chemical's hazard warning label or Safety Data Sheet, additional or more protective equipment may be required. For instance, if a project involves a chemical splash hazard; chemical goggles and/or face shields, aprons, and sleeves may be needed. Gloves, lab coats and any other potentially contaminated PPE shall not be worn outside the laboratory or into areas where food is stored and consumed.



All PPE must be appropriate for the chemicals being used and eye protection must be American National Standards Institute (ANSI) approved. Gloves should only be used under the specific conditions for which they are designed and selected. Based on the specific chemical hazards present, gloves should be selected by referring to glove manufacturer's selection charts. If adequate information cannot be obtained from the SDS or other sources, contact SRS at 277-2753 for assistance.

### **Respiratory Protection**

Respiratory protection should be the last choice in protecting lab personnel if the hazard cannot be eliminated through substitution of safer chemicals and/or engineering controls. Personnel required to wear a respirator at UNM shall do so only after medical authorization, documented training and documented fit testing. Contact SRS at 277-2753 for respiratory protection assistance.

All personal protective equipment should be kept clean and stored in an area where it will not become contaminated. Contaminated PPE should be cleaned or discarded and replaced. PPE should be inspected prior to use and replaced if unserviceable. Gloves that become contaminated or degrade over time must be discarded and replaced.

## **PARTICULARLY HAZARDOUS SUBSTANCES**

Additional safety requirements may apply for work with OSHA designated Particularly Hazardous Substances. These include select carcinogens, reproductive toxins, and chemicals having a high degree of acute toxicity. Chemicals in this category are listed as an attachment. The following controls are to be used as appropriate for the agent and process:

- Establishment of a designated area;
- Use of containment devices such as fume hoods or glove boxes;
- Mandatory administrative controls and PPE
- Procedures for safe removal of contaminated waste; and
- Decontamination procedures.

Designated areas for particularly hazardous substances must be formally established by developing SOPs and posting appropriate signage. A designated area can be the entire laboratory, a specific laboratory workbench, or a laboratory hood. Designated areas must be clearly marked with signs that identify the hazard and include an appropriate warning. Signage is also required for all containers and storage locations. Entrances to designated work areas and

storage locations must include signage, "AUTHORIZED PERSONNEL ONLY", in addition to the specific hazard warning wording.

Access to areas where particularly hazardous substances are used or stored must be controlled and limited to trained personnel when particularly hazardous substances are in use.

## CHEMICAL EXPOSURE ASSESSMENT

### **SURVEYS AND MONITORING**

Safety and Risk Services will conduct industrial hygiene surveys to evaluate chemical hazards for laboratory operations. Industrial hygiene surveys will include an assessment of the degree of worker exposures to chemicals and evaluation of exposure control measures. The industrial hygiene survey may include any of the following:

- Personnel interviews
- Reviewing chemical inventories and Safety Data Sheets
- Visual observation of laboratory operations/work practices
- Evaluation of potential exposure routes
- Evaluation of existing engineering controls
- Evaluation of Personal Protective Equipment
- Direct reading instrumentation

Where an industrial hygiene survey indicates workers might be exposed at or above an applicable occupational exposure limit, Safety and Risk Services will perform personal exposure monitoring to determine if exposures are within limits or if exposures need to be reduced. When necessary, utilizing the hierarchy of controls, SRS will make recommendations to reduce exposures below occupational exposure limits.

Medical consultation and medical surveillance will be provided for those potentially exposed above recognized standards or action levels, if there are signs or symptoms of a workplace exposure, or if the employee or supervisor express a concern over exposure and a need for medical consultation. See the sections on Medical Consultation and Medical Surveillance for more details.

### **MEDICAL CONSULTATION**

All faculty, staff, and students who work with hazardous chemicals shall have an opportunity to receive a free medical evaluation, including supplemental examinations which the evaluating physician determines necessary, under the following circumstances:

- Whenever a worker develops signs or symptoms associated with a hazardous chemical to which the worker may have been exposed in a laboratory.
- Where exposure monitoring reveals an exposure level routinely above the OSHA action level (or in the absence of an OSHA action level, the PEL or recommended exposure levels established by the National Institute for Occupational Safety & Health (NIOSH) or the American Conference of Governmental Industrial Hygienists (ACGIH)).
- Whenever an event takes place in the work area such as a spill, leak, explosion, or other occurrence resulting in the likelihood of hazardous exposure.

All medical examinations and consultations will be performed by or under the direct supervision of a licensed physician and be provided without cost to the worker, without loss of pay and at a reasonable time and place.

Employees may obtain free medical consultation regarding concerns about chemical or other occupational exposures by contacting Employee Occupational Health Services (EOHS) at 272-8043. Students with concerns about chemical or other occupational exposures should contact Student Health Services at 277-7810. These counseling services include reproductive health matters related to chemical exposures. For afterhours or weekend medical consultation, employees should go to UNM Hospital Emergency Department. **It is important to note that visit is part of a workplace related incident and not an insurance claim.**

### **MEDICAL SURVEILLANCE**

All employees who will potentially work with hazardous chemicals will have a pre-employment or an initial medical history and/or physical through Employee Occupational Health Services (EOHS). Employees with exposure to hazardous chemicals or other hazards that are covered under OSHA's expanded standards shall be provided medical surveillance by EOHS as prescribed by the particular standard under the following circumstances:

- Whenever a worker has developed signs and symptoms associated with exposure; or
- Whenever occupational exposure monitoring indicates exposures above the OSHA Action Levels.

Examples of hazards that are monitored through medical surveillance may include:

- Asbestos
- Benzene
- Ethylene Oxide
- Formaldehyde
- Lead
- Methylene Chloride

- Noise (Hearing Conservation Program)
- Respirator Use (Respiratory Protection Program)

Employees may be removed from medical surveillance when participation is no longer required due to a change in activities, job, exposure, etc.

Employees with questions regarding work-related medical surveillance should contact EOHS at 272-8043 or SRS at 277-2753 for more information.

## LABORATORY AUDITS

The laboratory Chemical Hygiene Officer will conduct and document an annual self-audit to assess laboratory compliance with the laboratory Chemical Hygiene Plan. The UNMHSC Laboratory Audit Form is attached (Attachment 4).

## HAZARDOUS CHEMICAL SPILLS AND ACCIDENTS

**All incidents must be reported immediately to your supervisor and Safety and Risk Services immediately.** Incidents include work related injuries, illnesses, property damage; spills or releases of hazardous substances, hazardous wastes, wastewater; regulatory violation. Priority must always be the safety and health, and appropriate medical treatment to those impacted by an incident. Reporting should be made to the Laboratory Chemical Hygiene Officer/Supervisor immediately and SRS within one hour. Notification to SRS can be made by calling 505-277-2753 during working hours, or 505-951-0194 in off-working hours. An incident reporting form is attached.

Workers must be provided the necessary training and understand the required spill response procedures before working with a hazardous chemical. It is the responsibility of the workplace supervisor and/or chemical Hygiene officer to have spill control clean-up materials and personal protective equipment which are appropriate for the chemicals being handled, readily available and accessible for emergency use. Chemical Hygiene Officer Handbook, with training guidelines are attached.

## MINOR SPILLS

A minor chemical spill is one that the workplace staff is capable of handling safely without the assistance of safety and emergency personnel (no additional PPE or personnel are required beyond normal operations with the hazardous materials). Properly trained chemical workers may clean up smaller spills following spill control, mitigation, clean up and reporting procedures given in the UNM Chemical Spill Response Program accessible at <http://srs.unm.edu/chemical-safety/spill-response.php>. Spill kits with instructions, absorbents, reactants and appropriate personal protective equipment (PPE) are to be maintained by the facility for the clean-up of minor spills.

## MAJOR SPILLS

**Employees should only attempt to clean up large or major hazardous chemical spills after special training has been received, and when appropriate spill cleanup materials and PPE are readily available and are properly utilized.** Otherwise, in the event of a major spill for which personnel are not trained and prepared, and particularly if any person has been significantly exposed, contaminated or injured to such an extent that medical or other outside assistance is required, follow the **E.A.R.** steps:

Evacuate affected area and close doors;

Alert Campus Police by 911; and

Remain close to the phone, if requested to do so, until contacted by emergency responders

All personnel potentially adversely affected in any way during an incident or accident should report for medical evaluation. Refer UNM employees exposed to hazardous chemical spills to Employee Occupational Health Services at 272-8043. Students are to be referred to Student Health Services 277-7810.

If any chemical spill occurs outside a building, with potential for adversely impacting storm water quality, contact Safety and Risk Services at 277-2753. If this attempt fails, call Campus Police and request that the appropriate Safety and Risk Services staff be contacted. Manage all debris and waste resulting from the cleanup of a spill as though it contains the hazardous chemical, in accordance with the UNM Chemical Spill Program.

# EMERGENCY RESPONSE EQUIPMENT AND KITS

## **Emergency Showers and Eye Wash Stations**

Emergency showers must be located such that they are accessible, require no more than ten (10) seconds to reach and are within 100 feet of the potential hazard. Eyewash units must be located such that they are accessible, require no more than ten (10) seconds to reach and are within 50 feet of the potential hazard (10 feet where strong corrosives are the hazard). **NOTE: Remember the injured worker may have to locate the unit while blinded by a contaminant.**

Emergency eyewash and showers must be kept accessible. Material shall not be stored or placed in such a manner that would block access to an emergency eyewash or shower. Eyewash stations and emergency showers must be inspected and maintained as required by the UNM Eyewash and Safety Shower Program accessible through the following link: [srs.unm.edu](http://srs.unm.edu).

Lab instructors/supervisors must train all persons that might be exposed to potentially injurious materials in the location and proper operation of eyewash, eye/face wash and safety shower units. Contact Safety and Risk Services for course materials or other assistance with this training.

## HAZARDOUS WASTE DISPOSAL

All chemical waste will be disposed of according to UNM's Hazardous Chemical Waste Program. Information on hazardous waste management can be found on the following link: <http://srs.unm.edu/hazardous-materials/>.

**Contact Safety and Risk Services at 277-2753 for assistance.**

# RESOURCES

## Regulatory Guidance

- [OSHA 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories](#)
- [OSHA 29 CFR 1910.1200, Hazard Communication](#)
- [OSHA 29 CFR 1910.132, Personal Protective Equipment](#)
- [OSHA 29 CFR 1910.133, Eye and Face Protection](#)
- [OSHA 29 CFR 1910.134, Respiratory Protection](#)
- [OSHA 29 CFR 1910.138, Hand Protection](#)

## Chemical Laboratory Safety

- National Research Council, *Prudent Practices in the Laboratory*, The National Academies Press, Washington, 2011 ([http://www.nap.edu/catalog.php?record\\_id=12654](http://www.nap.edu/catalog.php?record_id=12654))
- American Chemical Society, *Safety in Academic Chemistry Laboratories*, 7<sup>th</sup> Ed., vol. 1, (Student) ([www.acs.org](http://www.acs.org))
- American Chemical Society, *Safety in Academic Chemistry Laboratories*, 7<sup>th</sup> Ed., vol. 2, (Teacher) ([www.acs.org](http://www.acs.org))
- Furr, A.K., Ed. *CRC Handbook of Laboratory Safety*, 5<sup>th</sup> Ed. (<http://www.crcpress.com/>)

## Occupational Exposure Limits

- [OSHA 29 CFR 1910.1000, Air Contaminants](#) Subpart Z contains a list of OSHA PELs for hazardous chemicals
- American Conference of Governmental Industrial Hygienists, *ACGIH® Threshold Limit Values and Biological Exposure Indices*, (<http://www.acgih.org/>)
- American Conference of Governmental Industrial Hygienists, *Guide to Occupational Exposure Values*, (<http://www.acgih.org/>)

## Properties of Hazardous Chemicals

- *NIOSH Pocket Guide to Chemical Hazards* (<http://www.cdc.gov/niosh/npg/>) Industrial hygiene information on several hundred chemicals/classes including information on OSHA PELs, exposure routes, exposure symptoms, target organs, and first aid. Also contains personal protective equipment recommendations including respiratory protection. Available free online as either an online resource or downloadable format.
- *ToxNet* (<http://toxnet.nlm.nih.gov/>), National Library of Medicine online toxicology, hazardous chemicals, environmental health, and toxic release databases. Available free online.
- *HazMap* (<http://hazmap.nlm.nih.gov/>) National Library of Medicine online information on the adverse effects of workplace exposures to chemical and biological agents. HazMap links hazardous chemicals, job tasks, industries and occupational diseases. Available free online.

- *The Merck Index, 14<sup>th</sup> Edition* An encyclopedia of chemicals, drugs, and biologicals. Contains information on chemical and physical properties, hazards and therapeutic category, if applicable.
- *Sax's Dangerous Properties of Industrial Materials, 12<sup>th</sup> Edition* Hazard reference source for 28,000 substances encountered in industry. Contains data on toxicology, flammability, reactivity, explosive potential, and regulatory information.
- *Bretherick's Handbook of Reactive Chemical Hazards, 7<sup>th</sup> Edition* Considered to be the best source of information on reactivity risks such as fire, explosion, toxic material releases or high energy events of chemicals alone and in combination. Contains more than 5,000 entries on single elements or compounds, and 5,000 entries on interactions between two more compounds.

[Report to the University of Hawaii at Manoa on the Hydrogen/Oxygen Explosion of March 16, 2016: Report 2: Recommendations for Improvements in UH Laboratory Safety Programs, Prepared by the UC Center for Laboratory Safety, June 29, 2016.](#)



# ATTACHMENTS

UNMHSC Job Hazard Analysis Form

SOP – Hazardous Material Specific Template

NFPA 45 Table 10.1.1. Maximum quantities of flammables and combustibles in sprinklered laboratories

Laboratory Self-Audit Checklist

Incident Reporting Form-UNMHSC

Professional Visitor Safety and Health Awareness Acknowledgement Form