

# BOISE STATE CENTER FOR MATERIALS CHARACTERIZATION (BSCMC) LABORATORY SAFETY MANUAL

Original Author:	Dr. Karthik Chinnathambi, Laboratory Supervisor
Application:	MS Word
File Name:	BSCMC LSM 01-Feb-2016

## REVISION HISTORY

Rev.	Revision Description	Approved By:
1.0	As Issued	
		Dr. Rick Ubic, PI <span style="float: right;">date</span>
		Chris Siefert, COEN Safety Liaison <span style="float: right;">date</span>
		Suzy Arnette, EH&S Lab. Safety Officer <span style="float: right;">date</span>

# BSCMC LAB SAFETY MANUAL

## TABLE OF CONTENTS

<b>1.0 Scope .....</b>	<b>3</b>
<b>2.0 Lab Safety Checklist.....</b>	<b>3</b>
<b>3.0 Lab Operations and Hazards .....</b>	<b>4</b>
3.1 Description of Lab Operations .....	4
3.2 Hazards Summary.....	4
3.2.1 Chemical Hazards.....	4
3.2.2 Compressed Gas Hazards.....	5
3.2.3 Electrical Hazards .....	5
3.2.4 Noise Hazard .....	5
3.2.5 Ionizing radiation.....	5
3.2.6 Liquid Nitrogen.....	6
3.3 Business Hours .....	6
<b>Appendix A. Laboratory Evacuation .....</b>	<b>7</b>

# BSCMC LAB SAFETY MANUAL

---

## 1.0 SCOPE

This document is intended to provide safety information on the safety equipment, activities and hazards specific to the space(s) used by this lab. This document is intended to be used in conjunction with other lab safety training.

NOTE: If a space is shared by multiple PIs working independently, or if a space is shared by co-PIs that do not share the same research team, an additional lab safety manual must be co-written by the PIs. This affords all users of the shared space an understanding of all the activities and hazards within that lab.

It is mandatory that all individuals who perform work in the lab be fully aware of this document's existence, understand its contents, and satisfy the testing requirements associated with it. This burden of knowledge and training is the responsibility of both the PI and the individual lab worker.

---

## 2.0 LAB SAFETY CHECKLIST

Below is a checklist of important safety-related information for your lab space(s). **Familiarize yourself with this information. See 3.3 Appendix A Laboratory Evacuation more information.**

### **Lab Location: MEC 113**

Building Address: 1020 Manitou Ave.

Lab Phone Number: 208-426-5948 (MEC 113)

### Important Safety-Related Locations:

Secondary Contact Info: Lab entrances

Lab Safety Notebook: on wall near lab entrance

Nearest Fire Extinguisher: Near lab entrance

Nearest Fire Blanket: n/a

Nearest First Aid Kit: Near lab entrance

Nearest Eyewash/Safety Shower: Near lab entrance

Nearest Chemical Spill Kit: In lab, near the gas cylinder rack

Nearest AED: MEC 2nd floor opposite elevator

Nearest Fire Alarm Pull: At west & south MEC building exits - MEC 1st floor

Nearest Phone: North wall of the lab

Safe Assembly Area For Evacuation: Parking lot of ENGR Bldg.

Meet 1st Responders: On Manitou Ave.

---

## 3.0 LAB OPERATIONS AND HAZARDS

---

- 3.1 Description of Lab Operations** The operations and activities of this lab include the following:  
This lab serves as the main sample preparation laboratory for the transmission electron microscope in MEC 113a. It also houses an optical microscope, two x-ray diffractometers, and space for XRD sample preparation. The operations may be classified as follows:
- Cutting
  - Mechanical grinding/polishing
  - Electropolishing
  - Ion-beam thinning
  - Optical microscopy
  - Transmission electron microscopy
  - X-ray diffraction (including non-ambient)
  - Heating of items in a small oven  
(maximum temperature 200°C)

- 
- 3.2 Hazards Summary** The hazards of the lab's operation(s) include the following:
- Chemical
  - Compressed Gas
  - Electrical
  - Mechanical
  - Confined Space/Limited Egress
  - Flammable Gas/Liquid
  - Liquid Nitrogen
  - Pressure or Vacuum
  - Thermal Energy
  - Ionizing radiation – X-rays
  - Pinch/Crush
  - Noise - Ultrasound

All lab users should complete the **Boise State Emergency Response Guide** module.

- 
- 3.2.1 Chemical Hazards** Chemical hazards must be described in the protocols that use them. Consult these protocols or your PI if you have questions.
-

# BSCMC LAB SAFETY MANUAL

---

Information on managing chemical spills and handling chemical waste can be found in the **COEN General Lab Safety** module.

Your PI may assign additional hazardous material handling and storage training specific to this lab's activities.

- The laboratory is equipped with an exhaust hood. This hood must be used whenever handling hazardous materials that can become airborne at levels approaching or greater than OSHA limits. **This hood is NOT to be used with Perchloric Acid.**
- Information on the safe handling, storage and disposal of chemical etchants can be found in the Jet Polisher SOP

---

### **3.2.2 Compressed Gas Hazards**

Safety information and training on compressed gas hazards can be found on the following:

- **Compressed Gas Cylinder Change** (COEN SOP)

Your PI may assign additional compressed gas safety training specific to this lab's activities.

---

### **3.2.3 Electrical Hazards**

Information on working with electrical devices can be found in the **COEN General Lab Safety module**.

Your PI may assign additional electrical training specific to this lab's activities.

---

### **3.2.4 Noise Hazard**

The use of ear defenders may be desirable when using the ultrasonic disk grinder

---

### **3.2.5 Ionizing radiation**

High-energy x-rays are produced by the Bruker AXS and Rigaku Miniflex powder x-ray diffractometers.

- Both large and small doses of radiation can cause cellular damage. The extent of the damage depends upon the total amount of energy absorbed, the time period and dose rate of the exposure, and the particular organs exposed. The risk is controlled by: (1) Ensuring that the safety mechanism on the chamber doors and x-ray shutter is not tampered with, (2) Eliminating food and drink in lab and (3) Washing hands immediately after leaving lab.
- Direct exposure to the x-ray beam is minimized in the following ways, (1) The x-ray beam will only be on in the safe environment of the enclosed x-ray chamber and (2) safety beam shut-off

# BSCMC LAB SAFETY MANUAL

---

mechanism will automatically be triggered if the chamber doors are not fully closed.

**Any exposure incidents or accidents involving x-rays should be reported immediately to the Laboratory Supervisor and the Boise State radiation safety officer.**

Your PI may assign additional radiation safety training specific to this lab's activities..

---

### **3.2.6 Liquid Nitrogen**

Liquid nitrogen is used in the Transmission Electron Microscope (TEM) and Bruker x-ray diffractometer instruments. Safety information and training on liquid nitrogen safety can be found on the following:

- **Liquid Nitrogen Handling** (COEN SOP)

Your PI may assign additional cryogenic safety training specific to this lab's activities.

---

### **3.3 Business Hours**

With the exception of official university holidays, the normal hours of operation for the lab are:

**Monday – Friday  
8:00am – 5:00pm**

Any qualified user is entitled to use the lab during these times.

Out-of-Hours Use:

The Laboratory Supervisor and qualified Laboratory Workers (as defined in the COEN General Lab Safety Module) may use the lab outside these times provided that at least one other person is also present within earshot.

No user should be present in the lab on his/her own outside of normal business hours.

No work involving chemical solvents, acids, bases, furnaces, or other “dangerous” aspects should be conducted outside of normal business hours.

---

# BSCMC LAB SAFETY MANUAL

## Appendix A. Laboratory Evacuation

**When ordered to evacuate or when alarms are activated, ALWAYS LEAVE IMMEDIATELY.**

- Unless ordered otherwise by officials, designated Building Coordinators and/or alternates and assistants (identified with red armbands) shall direct and ensure, to the extent practical, that a safe personnel evacuation is conducted. Treat all alarms as warning of an actual emergency situation.
- All department heads, faculty, managers and supervisors must help direct employees, students, visitors and each other to obey evacuation instructions of emergency response personnel and/or the Building Coordinators.
- Building Coordinators and/or alternates and assistants shall notify emergency personnel immediately upon their arrival at the scene concerning the status of the evacuation, the exact location of any injured or trapped persons, those waiting in designated Areas for Evacuation Assistance, any others who may be anywhere in the building, and any other relevant information on the emergency situation.

**Exit quickly and calmly using nearest emergency escape routes and marked exits and proceed to Safe Assembly Locations. DO NOT USE ELEVATORS!**

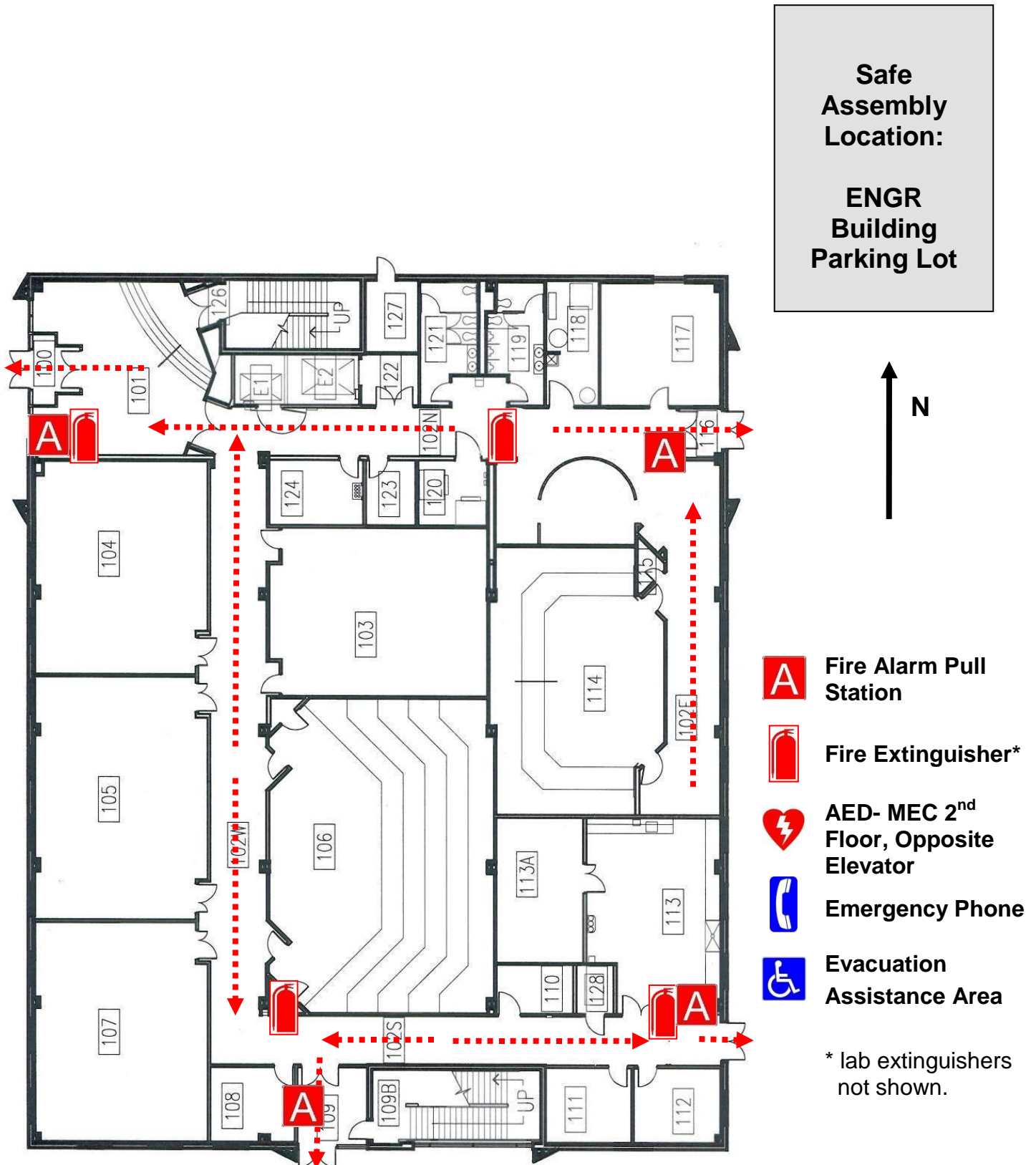
- Do not attempt to use elevators during an emergency. Elevators are called to the first floor when the fire alarm system is activated. Use only stairways in an evacuation.
- Use clear, safe escape routes and exits and proceed to the nearest outside Safe Assembly Location shown on this building's posted evacuation map, or to a location ordered by emergency response personnel. Do not return to an evacuated building until directed by University officials.
- If possible, take your coat and keys but do not take time to go to lockers or offices for personal possessions.
- Where applicable and, if possible and safe, turn off laboratory gases, exhaust fans, and close doors/windows as you exit.

**Assist persons requiring evacuation assistance to get to designated Areas for Evacuation Assistance. Be alert for trapped, injured, or other persons requiring assistance.**

- Transporting of individuals requiring evacuation assistance up or down stairwells shall be avoided until emergency response personnel have arrived. Unless imminent life-threatening conditions exist, relocation of these individuals shall be limited to the designated Areas for Evacuation Assistance.
- Notify emergency personnel immediately upon their arrival of the exact location of any injured or trapped persons, those waiting in designated Areas for Evacuation Assistance, and any others who may be anywhere in the building.

# BSCMC LAB SAFETY MANUAL

## Evacuation & Safety Equipment Map- Micron Engineering Center, 1st Floor







**TABLE OF CONTENTS**

**1.0 Scope ..... 4**

**2.0 Emergency Response ..... 4**

    2.1 Calling 9-1-1 ..... 4

    2.2 Boise State Emergency Response Guide ..... 5

**3.0 Lab Practices..... 5**

    3.1 Stop Work Practice..... 5

    3.2 Lab Access Restrictions ..... 5

    3.3 Personal Behaviors ..... 6

    3.4 Electrical Safety..... 6

    3.5 Lab Incidents, Accidents and Property Loss..... 6

**4.0 Hazard Control Methods..... 7**

    4.1 Heirarchy of Hazard Control ..... 7

    4.2 Elimination ..... 7

    4.3 Substitution..... 7

    4.4 Engineering Controls ..... 7

    4.5 Administrative Controls..... 7

        4.5.1 Lab Signage..... 7

        4.5.2 Lab Training..... 8

        4.5.3 Training for Shared Lab Spaces ..... 8

        4.5.4 Training Requirements..... 9

        4.5.5 Laboratory Safety Notebook(s) ..... 10

        4.5.6 Chemical Ordering ..... 10

        4.5.7 Chemical Labeling ..... 10

        4.5.8 Chemical Inventories ..... 10

    4.6 Personal Protective Equipment ..... 11

**5.0 Chemical Emergencies..... 12**

    5.1 Chemical Contact ..... 12

    5.2 Large Chemical Spill..... 13

    5.3 Small Chemical Spill..... 13

    5.4 Uncontained Spill Release..... 14

    5.5 Spill Investigation Report..... 14

**6.0 Waste Management ..... 15**

    6.1 Definition of Waste ..... 15

    6.2 Hazardous Wastes ..... 15

    6.3 Waste Pickup..... 15

# COEN GENERAL RESEARCH LAB SAFETY MANUAL

6.4	Illegal Disposal of Waste .....	16
6.5	Segregation of Waste .....	16
6.6	Hazardous Waste Containers.....	16
<b>7.0</b>	<b>Additional Resources .....</b>	<b>17</b>
7.1	COEN Safety Liaison.....	17
7.2	EH&S.....	17
7.3	COEN Safety Website .....	17
7.4	BroncoAlert.....	18

## 1.0 SCOPE

This document describes the standard operating procedures and practices encountered and to be practiced in the College of Engineering research laboratories.

Due to the scope of the various activities of the lab regarding chemical usage, processes, and waste generation, this document is not intended to be comprehensive. Instead, it is intended to provide a general overview in defining safe work practices.

In addition to this general lab safety manual, additional training is required for each lab. See Section 4.5.2 for more information.

It is mandatory that all individuals who perform work in the lab be fully aware of this document's existence, understand its contents, and satisfy the testing requirements associated with it. This burden of knowledge, therefore, is the responsibility of both the PI and the individual.

---

## 2.0 EMERGENCY RESPONSE

---

### 2.1 Calling 9-1-1

- **If possible, first get out of immediate danger.**
- **To report any medical emergency or fire, call 9-1-1 from any phone.**
- **In the event of a fire, or if you feel the building's occupants are in danger:**
  - **Activate the building's fire alarm system before calling 9-1-1. Evacuate the building immediately!**
  - **If your building does not have fire alarm pulls, call University Security & Police at 426-6911 so that the alarm may be remotely activated.**

For other emergencies, contact University Security & Police at 426-6911.

When calling 9-1-1:

- Stay on the line with the dispatcher.
  - Provide the address of the building involved and your exact location when calling from a cell phone. The building address is located on the Emergency Contact sign on the door of your lab.
  - Provide a thorough description of the incident to ensure that proper resources are dispatched.
  - Do not hang up until the dispatcher tells you to do so.
  - Follow up the 9-1-1 call with a call to University Security & Police at 426-6911.
-

## 2.2 Boise State Emergency Response Guide

The [Boise State Emergency Response Guide](#) is a document that describes appropriate responses in a variety of emergency situations. This guide is to be part of the lab safety notebook and can be found [here](#).

Also, emergency response topics can be accessed online through the links below.

- [General Instructions for all Emergency Situations](#)
  - [Active Shooter](#)
  - [Bomb Threats](#)
  - [Building Evacuation](#)
  - [Fire and Smoke](#)
  - [Flooding](#)
  - [Hazardous Materials](#)
  - [Medical Emergencies](#)
  - [Natural Gas Leaks and Pipeline Breaks](#)
  - [Power Shortages and Outages](#)
  - [Report a Crime](#)
  - [Report Sexual Assault](#)
  - [Report Unsafe Conditions/Incidents](#)
  - [Work-Related Injury or Illnesses](#)
- 

## 3.0 LAB PRACTICES

---

### 3.1 Stop Work Practice

- A worker should never perform a job if she/he believes it to be unsafe or if inadequate PPE is available or sufficient safety measures are in not place.
  - If a worker feels a job cannot be performed safely, she/he should see her/his supervisor immediately for resolution.
  - If a worker feels pressured into performing a job they believe to be unsafe, they should contact their PI and/or the [COEN Safety Liaison](#), Section 7.1 immediately.
- 

### 3.2 Lab Access Restrictions

Lab access is provided to members of the research team as determined by the PI. Others seeking access must make prior arrangements before entering the lab as described below:

- Visitors to the lab must first obtain prior approval by the lab PI (or designee of the PI) before entering. Visitors must also be accompanied by a member of the research team.
  - Support workers must discuss the nature of their work with the PI to determine if they may enter and whether they may work without oversight by research team members.
-

# COEN GENERAL RESEARCH LAB SAFETY MANUAL

---

## 3.3 Personal Behaviors

- Workers must be familiar with the hazards of the materials with which they are working.
  - No food or drink is permitted in the lab.
  - No unauthorized experiments are permitted.
  - Personnel must have pre-approval by his/her direct supervisor in order to perform work alone.
  - Work should not be conducted if the researcher is feeling tired or otherwise impaired.
  - No rough-housing is permitted in the lab.
  - When performing an operation, consider if nearby workers require additional protection and take appropriate measures.
  - Employ good housekeeping rules by maintaining a clean, uncluttered work area.
- 

## 3.4 Electrical Safety

Labs often rely on custom electrical circuits and devices to perform their work. However, there are limitations to what labs are able to do without the assistance of a licensed electrician.

When lab members intend to design, fabricate or modify electrical circuits that have voltages that exceed either 30 volts ac rms or 60 volts dc, they must first discuss the work with the [COEN Safety Liaison](#), Section 7.1.

The safety liaison will then contact a University electrician to see if their assistance is required.

---

## 3.5 Lab Incidents, Accidents and Property Loss

**Note: If you have any emergency, first take appropriate measures as described elsewhere in this manual.**

If you have an incident your lab, whether it was an actual accident or just a “near miss”, it should be reported using an incident/accident report form. These can be found on the Risk Management web page: <https://rmi.boisestate.edu/forms-listing/> If a student was involved, use the “Incident/Accident Injury Report.” If an employee was involved, use the “Supervisor’s Accident Report (SAR).”

Fill out the appropriate form and send copies to [breckskinner@boisestate.edu](mailto:breckskinner@boisestate.edu), [christophersiepert@boisestate.edu](mailto:christophersiepert@boisestate.edu), and your direct supervisor/PI.

Your lab notebook should include hard copies of these forms and a flow chart to describe how to handle an incident/accident.

---

---

## 4.0 HAZARD CONTROL METHODS

---

**4.1 Heirarchy of Hazard Control** Five commonly used methods to reduce the risk of hazards are shown in priority order:

1. Elimination
2. Substitution or reduction
3. Engineering controls
4. Administrative controls
5. Personal protective equipment (PPE)

While many are familiar with examples of PPE, it is important to understand the other methods and why they need to be employed first, before PPE, for hazard mitigation.

---

**4.2 Elimination** Hazard elimination is the best way to provide hazard mitigation by physically removing the hazard. An example would be to use a non-toxic material in place of a toxic one where possible.

---

**4.3 Substitution** In many cases, hazards can be reduced by substituting a less toxic material or a smaller amount of the material.

---

**4.4 Engineering Controls** Engineering controls are lab systems or features that protect all workers by removing the hazard from the lab, or sequestering the hazard. Examples of engineering controls include:

- fume hoods or other local exhaust systems to remove vapors and/or particles at source
- specialized storage systems such as flammables, acids, and corrosives cabinets, sharps containers, etc.)
- safety shields on tools
- “glove boxes” to contain hazardous materials

For more detailed information on the engineering controls required in your lab, consult the protocols and procedures for specific lab processes and/or discuss with your lab PI or supervisor.

---

**4.5 Administrative Controls** Administrative controls play an important part of reducing hazard risk when the above methods are not sufficient. Below are administrative controls that are in place for this laboratory.

---

**4.5.1 Lab Signage** The number of signs should be kept to a reasonable minimum and be clear and concise.

Information relating to the general hazards, PPE, and rules of the lab will be posted on the each laboratory entrance from the main hall.

If a phone is provided in the lab, the secondary contact information should also be provided adjacent to the phone.

---

## **4.5.2 Lab Training**

Before performing any work in the laboratory, each worker must receive training as assigned by the PI. This training may include core training required for all workers as well as task-specific training based on the role of the worker in the lab.

The training may be delivered through various methods, including assignment of online modules, distribution of hardcopies or by hands-on training. More information on the assignment of training can be found in Section 4.5.4 [Training Requirements](#).

---

## **4.5.3 Training for Shared Lab Spaces**

Shared lab environments require additional consideration in terms of assignment of appropriate lab training for the space. The workers must be trained to understand all of the hazards that exist within the space.

For shared spaces that are used by multiple PIs working independently or by co-PIs that have different research teams, a lab-specific safety manual should be developed by the PIs for the lab. Additional lab-specific training can be assigned by the PIs as needed.

---



# COEN GENERAL RESEARCH LAB SAFETY MANUAL

## 4.5.4 Training Requirements

Certification level is determined by the type of work performed or responsibilities held in the lab:

1. A Laboratory Visitor is a person who does not work in the laboratory but is simply visiting. All visitors must be escorted by a laboratory worker. Any person in the lab who does not fall in one of the categories below can be considered a lab visitor.
2. A Support Worker is a person who supports the facility, IT or other needs of the laboratory. Refer to Section 3.2 [Lab Access Restrictions](#) for information on lab access restrictions.
3. A Laboratory Worker is a person who performs work in the laboratory, regardless of whether that work is frequent or infrequent.
4. The Laboratory Manager is the person designated by the PI(s) who oversees the day-to-day activities within the lab.
5. The Principal Investigator (PI) is the person responsible for overall laboratory activities including laboratory safety initiatives. These initiatives include defining safety practices and training materials, assessing the training level needed for each worker, ensuring safety training records are maintained and support of periodic inspections.

Completion of the following training is required for the worker types as shown below.

	COEN General & Lab-Specific Safety Manuals	Task-Specific Protocols & SOPs	Other Online Training Modules	BSU Emerg. Resp. Guide	BSU Chem. Hygiene Plan
Lab Visitor	No	No	No	No	No
Support Worker	No	No	No	Yes	No
Lab Worker	Yes	As req'd, based on lab role	As req'd, based on lab role	Yes	Familiar *
PI, Laboratory Manager	Yes	All	All**	Yes	Familiar *

\*must have a good understanding of the topics covered in the document and be able to readily reference it as needed.

\*\*must complete all online training modules assigned by PI to workers in their lab.

## **4.5.5 Laboratory Safety Notebook(s)**

The laboratory safety notebook(s) is intended to provide a variety of safety-related content that can be readily accessed by lab members and visitors to the lab.

In general, the notebook will contain:

1. This document
2. The lab-specific safety manual(s) for your lab(s)
3. Other training materials (protocols, SOPs, etc.)
4. Boise State Emergency Response Guide
5. Current contact information for COEN and BSU safety personnel
6. Information and forms relating to lab incidents/accidents
7. Records of safety training for each lab worker (Note: These may be located elsewhere but must be readily accessible).
8. Chemical inventory and MSDSs for lab

More information on how to organize a lab safety notebook can be obtained by contacting the [COEN Safety Liaison](#), Section 7.1 or by clicking [here](#).

---

## **4.5.6 Chemical Ordering**

- Lab personnel will order all chemicals in accordance with the College of Engineering chemical ordering policy.
  - This policy is designed to provide guidelines for how chemicals are ordered and delivered to laboratories.
  - For more information on the policy and the process to be followed, contact the [COEN Safety Liaison](#), Section 7.1.
- 

## **4.5.7 Chemical Labeling**

All chemicals, including those stored in temporary storage, must be properly labeled. Do not write over information printed on chemical labels. For temporary storage, include all the information from the chemical inventory list as well as the creation date of the temporary storage.

---

## **4.5.8 Chemical Inventories**

- A chemical inventory of the laboratory is to be performed on a yearly or more frequent basis.
  - The best way to maintain a chemical inventory is to make real-time adjustments as chemicals are ordered or depleted.
  - Contact the [COEN Safety Liaison](#), Section 7.1 for more information.
  - Please read all worksheets to understand what chemicals require inventory and how to properly record the information.
  - The completed inventory is to be printed and stored in the Laboratory Safety Notebook(s).
-

## 4.6 Personal Protective Equipment

The information provided below is intended only to provide an overview of Personal Protective Equipment (PPE) requirements that may exist for your lab.

PPE should be considered the last avenue in providing work protection and be implemented only if elimination, substitution, and engineering and administrative controls cannot provide sufficient protection.

In general,

- **Closed-toe shoes and leg coverage** must be worn in the lab at all times.
- **Safety glasses** must be worn under the following circumstances in labs:
  - Performing sawing, grinding or cutting operations
  - When there is any foreseeable risk of injury to your eyes.
  - Use of any chemical.
- **Lab safety coats and gloves** must be worn when handling chemicals and biomaterials.

For more detailed information on the PPE required in your lab, consult the protocols and procedures for specific lab processes and/or discuss with your lab PI or supervisor.

**If you feel you are engaged in a process that places you at risk, it is your responsibility to wear the appropriate PPE, if available, or halt work until the proper PPE can be procured.**

NOTE: *Grainger Industrial Supply* ([www.grainger.com](http://www.grainger.com)) is a good source for purchasing of, and information on, PPE. See your PI or laboratory supervisor for information on, and proper fitting of, PPE.

---

## 5.0 CHEMICAL EMERGENCIES

---

### 5.1 Chemical Contact

- **If you come in to contact with a chemical, and are not sure how dangerous the chemical contact is, call 9-1-1.**
  - The treatment of a chemical exposure takes precedent over spill cleanup, spill containment, or property damage including water damage from the use of an eyewash or safety shower.
  - In the event of chemical contact with skin or eye, flush the affected area with water for a minimum of 15 minutes. Use the nearest safety shower and eye wash station as identified by the [Lab Safety Checklist](#) in the safety manual for your lab. If possible, obtain assistance to remove contaminated PPE and clothing after flushing has begun.
  - If contact is made through inhalation, immediately move to an area of fresh air away from the exposure.
  - After immediate treatment for the exposure has been completed, contact your supervisor; then call University Security and Police at 426-6911.
  - Have the SDS information for the chemical(s) available for reference. This information can be found in your lab safety notebook. If first responders are summoned, meet them at the location described in the Lab Safety Checklist in your lab safety supplement with the SDS information for the chemical(s) that were contacted.
  - After the immediate needs associated with the contact have been dealt with, contact Boise State Risk Management to complete the proper forms relating to the exposure. See Section 3.5.
  - Complete a [Spill Investigation Report](#) from Section 5.5.
-

## 5.2 Large Chemical Spill

A large spill is a spill greater than 200mL or 200 g OR any amount of an extremely hazardous substance OR beyond the cleaning capabilities or comfort level of the laboratory or laboratory workers.

**If deemed necessary, or you are unsure of spill severity, immediately call University Security and Police at 426-6911. You may also pull a fire alarm or request them to sound the alarm.**

Otherwise, take the following steps:

- Inform others in the area of the spill.
- Turn off any gas burners without putting yourself in harm's way.
- Retrieve SDS(s) without putting yourself in harm's way.
- Evacuate the area, closing the doors behind you.
- Contact your supervisor; then call University Security and Police at 426-6911.
- Post warning signs outside the area, and lock doors if possible to prevent re-entry.
- Complete a [Spill Investigation Report](#) from Section 5.5.

---

## 5.3 Small Chemical Spill

A small spill is defined as a spill less than or equal to 200mL or 200 g AND not of an extremely hazardous substance AND within the cleaning capabilities and comfort level of the laboratory and laboratory workers.

**If you are not sure, or uncomfortable with the cleanup, contact your supervisor and University Security and Police at 426-6911.**

Otherwise, take the following steps:

- Inform others in the area of the spill.
  - Turn off any gas burners without putting yourself in harm's way.
  - Retrieve SDS(s) without putting yourself in harm's way.
  - Review applicable SDS(s) and determine controls, PPE, and need for assistance.
  - Put on necessary protective clothing (gloves, safety goggles or glasses, and lab coat).
  - Use spill kit in lab to absorb the spill. This may require acid or base neutralizing absorbent. Clean spill area working from outside toward the center.
  - Rinse spill area with water, and wipe up with paper towels. Label and retain spill materials for EHSS.
  - Contact your supervisor; then call University Security and Police at 426-6911 so that they may contact EHSS.
  - Complete a [Spill Investigation Report](#) from Section 5.5.
-

## 5.4 Uncontained Spill Release

A spill or release of chemicals into any drain is an uncontained spill release. **Communicate all uncontained spills to a member of EHSS at 863-8024 (24-hr cell) so that they can contact the proper authorities.**

If EHSS cannot be reached, the responding faculty or staff member must report the spill to the COEN Safety Liaison, Section 7.1) or

### Lander Street Wastewater Treatment Plant:

Normal hours: 608-7382

After hours: 608-7380

### Boise Department of Public Works Pretreatment Contacts

Mike Hunter, Senior Environmental Specialist 384-3993

Walt Baumgartner, Pretreatment Prog. Coordinator 384-3991

Terry Alber, Senior Environmental Specialist 384-3992

Also, complete a [Spill Investigation Report](#) from Section 5.5.

---

## 5.5 Spill Investigation Report

A Spill Investigation Report form must be completed in the event of a spill or an uncontained release of chemicals into a drain. The form can be found [here](#) or by going to:

<http://operations.boisestate.edu/ehs/files/2011/09/SpillInvestigationReport.pdf>

Contact [EHSS](#) (Section 7.2) for assistance in completing this form if necessary.

---

## 6.0 WASTE MANAGEMENT

---

### 6.1 Definition of Waste

A variety of solid and liquid wastes can be generated in the laboratory. Any lab worker or student that works with chemicals is required to understand how to safely handle, store, and dispose of these materials.

Once you determine a material:

- cannot be reused,
- cannot be used for its intended purpose,
- has exceeded its shelf life,
- has no known owner or generator,
- is no longer wanted or needed, or
- is an end product of a process or experiment that cannot be used as feedstock in an existing process,

IT IS A WASTE.

- Please remember that maintenance fluids must, in most cases, be disposed of as waste.
- 

### 6.2 Hazardous Wastes

- Waste classified as Hazardous Waste must be disposed of properly, in accordance with BSU's [Hazardous Waste Management Manual](#).
  - If you have any questions regarding whether a waste material is hazardous or how to store or dispose of it, contact the EHSS Hazardous Waste Officer in [Section 7.2](#).
- 

### 6.3 Waste Pickup

All chemical waste generated in Boise State laboratories must be disposed of by EHSS.

The use of the online system [Chematix](#), allows the user to characterize the waste and enter a pickup request into the system, which, in turn, notifies EHSS to come pick it up.

For training on how to use Chematix, or if you have any questions regarding how to handle waste, contact either your lab PI, supervisor, [COEN Safety Liaison](#), Section 7.1, or Hazardous Waste Officer, [Section 7.2](#).

---

## 6.4 Illegal Disposal of Waste

Examples of illegal waste treatment include:

1. Leaving solvent-wetted materials or containers on the bench top or in fume hood to evaporate.
  2. Diluting a waste to render it non-hazardous.
  3. Venting a pressurized aerosol can solely to remove the contents.
  4. Disposing a waste down the sink or drain without prior approval from EHSS. Consult with the EHSS Hazardous Waste Officer, [Section 7.2](#) before disposing of any chemical down a sink or drain.
- 

## 6.5 Segregation of Waste

You must segregate your waste streams.

- Keep liquids and solids in separate containers
- Keep hazardous and non-hazardous waste in separate containers.

You must physically segregate, by secondary containment (separate spill trays, cabinets, etc.), your hazardous waste while in storage from the following:

- non-hazardous waste
  - drains
  - incompatible waste
  - product chemicals
- 

## 6.6 Hazardous Waste Containers

If hazardous waste is not in its original container, make sure the replacement container is of a material that has long term compatibility with the waste.

Hazardous waste containers must be closed/sealed to the manufacturer's specifications. The only time a hazardous waste container can be open is when you are actively putting waste in the container.

Hazardous waste containers must be in good condition; replace deteriorated or damaged containers immediately.

Make sure you use only containers that seal properly and reliably. Those that don't, are considered open (non-compliant) containers.

Examples of open containers include:

- "zip-lock" bags with a damaged seal or with material in the seal
  - a container with an improperly fitting or missing lid;
  - a container or bag that has a crack, hole or tear
-



## 7.0 ADDITIONAL RESOURCES

---

### 7.1 COEN Safety Liaison

The College of Engineering is staffed with a safety liaison that works closely with COEN labs and the Boise State Environmental Health, Safety and Sustainability (EHSS) team. The safety liaison can also help with chemical ordering, handling chemical waste and many other issues.

Contact information for the COEN Safety Liaison can be found below:

Chris Siepert, Lab Safety Specialist

Office: ENGR 332

email: [christophersiepert@boisestate.edu](mailto:christophersiepert@boisestate.edu)

Office: 426-3913 cell: 208-440-8591

---

### 7.2 EHSS

The Boise State Environmental Health, Safety and Sustainability (EHSS) team can provide a wealth of information regarding university policy and safety information regarding laboratory work across campus. Two members of the EHSS staff that support COEN labs heavily are:

- Suzy Arnette, Lab Safety Officer  
[suzyarnette@boisestate.edu](mailto:suzyarnette@boisestate.edu)  
ph. 426-3906
- Jane Bartlett, EHSS Hazardous Waste Officer  
[janebarlett@boisestate.edu](mailto:janebarlett@boisestate.edu)  
ph. 426-3303

Additional information regarding other members of the EHSS team, university policy, training, etc. is provided on their website site at:

- <http://operations.boisestate.edu/EHS>
- 

### 7.3 COEN Safety Website

The COEN Safety website is hosted on the College of Engineering's website at <http://coen.boisestate.edu/safety>.

Topics of the website include:

- Emergency response information
  - Safety training resources for research and teaching labs as well as for student projects
  - Commonly used forms, documents and templates
  - Chemical management guidance, including chemical ordering, chemical inventory and SDS record-keeping
-

## **7.4 BroncoAlert**

All students, faculty and staff are encouraged to opt in with their personal contact information to BroncoAlert, the emergency notification system at Boise State. The phone and text-based system allows the university to notify students, faculty and staff when an emergency is taking place on or near campus. The system will only be used in critical situations, including weather emergencies, with potential to affect health or safety.

More information on how to register for BroncoAlert can be found at <http://news.boisestate.edu/bronco-alert/>

---