

Laboratory Safety and Environmental Health Assessment Program

Principal Investigators and Faculty are vital to the success of safety and environmental compliance programs in Colorado School of Mines research and teaching laboratories. Principal Investigators and Faculty are responsible for ensuring safe operating procedures, and providing training and supervision to students and lab workers. They must ensure research activities are designed and conducted in a manner that makes safety a priority and follows applicable environmental health standards and policies.

The Environmental Health and Safety Department (EHS) strives to support the core research and teaching mission of Mines. Comprehensive laboratory evaluations help ensure that work within campus laboratories is occurring safely and in compliance with applicable laws, guidelines and Mines Policies. This Program is intended to promote safety in laboratory activities and aid Principal Investigators and Faculty with laboratory safety and environmental protection responsibilities.

This Laboratory Assessment Program identifies four processes to evaluate safety and environmental health programs and includes:

1. Laboratory Self-Inspections
2. EHS Assessment Activities
3. Results and Corrective Measures
4. Laboratory Assessment Program Review

Laboratory Self-Inspections

Properly conducted self-inspections assure safe working conditions and compliance with environmental regulations. Lab personnel should look at all areas and address safety and environmental compliance concerns they identify. Individual laboratories may request assistance with laboratory inspection procedures from EHS personnel.

Laboratory self-inspections should be conducted by Principal Investigators, Faculty or a representative of a laboratory appointed by the Principal Investigator. At a minimum, EHS recommends conducting inspections at the beginning of each semester. This schedule gives new laboratory personnel an opportunity to participate in the self-inspection process and become familiar with safety and environmental compliance issues specific to the laboratory location.

The Laboratory Assessment Checklist included in this Program in Appendix A may be followed for self-inspections. The checklist is divided into three sections and includes:

- Environmental Health Assessment,
- Chemical Hygiene Assessment, and
- Fire/Life Safety Assessment.

A comprehensive laboratory self-inspection must consider all sections of this checklist. The required weekly inspection of laboratory waste storage areas addresses only the Waste Handling Section of the Environmental Health Assessment.

Specific lab locations may have an existing checklist for specific safety or environmental compliance issues that are not included in this checklist. These labs should work with EHS to modify an assessment checklist that best addresses specific safety and environmental compliance needs. Examples may include a checklist for a laboratory housing radioactive materials, radiation producing equipment or lasers.

EHS Assessment Activities

EHS assessment activities may occur for any of the following reasons:

- As requested by a Principal Investigator, Research Faculty or lab personnel;
- Part of a routine annual inspection program;
- A mandatory investigation following a reported laboratory [Safety Concern](#);
- Part of an accident investigation; or
- To collect information following a regulatory agency inspection.

EHS will use the Laboratory Assessment Checklist included in this Program in Appendix A to standardize the inspection process. These completed checklists will be maintained in EHS files so past assessment activities may be easily compared to current assessment results. The goal is to identify and eliminate recurring environmental compliance and safety issues. EHS will also develop a tracking program to measure the number and type of environmental compliance and safety concerns campus wide.

During the assessment, EHS will work with the Principal Investigator, Faculty, or laboratory personnel to address and correct safety and environmental compliance issues that can be corrected at the time of the assessment. If safety and environmental compliance issues cannot be adequately addressed during the lab visit, EHS will prepare a written assessment report and recommended corrective measures for the Principal Investigator and Department Head. See the Results and Corrective Measures section of this Program for specific notification procedures.

The Department Head will be notified in advance of the EHS laboratory visit and assessment activities. Department Heads are encouraged to announce the schedule to their department personnel and have them conduct self-inspections. Appendix B contains a sample of the routine annual inspection notice.

Results and Corrective Measures

Assessment results will be communicated to the Principle Investigator and the Academic Department Head. Results will be summarized using the following ratings.

- Requires Immediate Attention - Safety or environmental compliance issues exist that could immediately cause injury, fire, impact the health of laboratory personnel, or result in a violation by a regulatory agency.

- Requires Corrective Actions – Safety or environmental compliance issues exist but do not pose an immediate threat, but must be repaired in a timely manner.
- Meets Expectations - Safety or environmental compliance issues identified and corrected during inspection process.
- Excellent – No Safety or environmental compliance issues identified.

Laboratories that implement a regularly scheduled, comprehensive self-inspection program should easily achieve an assessment summary rating of excellent or Meets Expectations.

Laboratories having safety or environmental compliance issues requiring immediate attention will be identified to the Principal Investigator and the Academic Department Head in a memo from EHS. The memo will identify the specific items that require immediate attention and guidelines to eliminate or repair the safety or environmental compliance concern. The completed Laboratory Assessment Checklist will be attached to the memo.

The cost to eliminate safety and environmental compliance issues is the responsibility of the academic department. In some cases, EHS may assist by using available EHS funds as well as working with vendors to obtain appropriate equipment and price quotes to repair and eliminate the identified concerns. Requested for funding assistance may be submitted to the Senior Vice President of Finance and Administration.

The Senior Vice President of Finance and Administration will be notified of unresolved safety and environmental compliance issues. Reports of close calls and near miss incidents are reported to the Mines Executive Committee.

Laboratories having safety and environmental compliance issues that require corrective actions will be identified to the Principal Investigator by e-mail communication. A summary of the assessment results will be provided along with recommended corrective actions and a schedule to eliminate the safety and environmental compliance concerns.

Targeted re-inspections will be completed to ensure the lab qualifies for a meets expectations rating. Failure to address safety or environmental compliance issues in a lab space will be managed on a case by case basis.

Laboratories that achieve a rating of Excellent or Meets Expectations will be reviewed by the Campus Safety Committee and recommendations will be made to the Provost to recognize the Principal Investigator and the laboratory personnel.

Laboratory Assessment Program Review

The Laboratory Assessment Checklist will need to be revised as problem areas are identified or as changes in regulations occur. The records of EHS assessment reports and completed assessment checklists will be maintained electronically and in a dedicated file. These records should be maintained so trends and program improvements may be implemented.

Appendix A

Environmental Health and Safety Laboratory Assessment Checklist



**Environmental Health and Safety
Environmental Health Laboratory Assessment**

PI: _____ Department: _____
 Lab Contact: _____ Lab Phone: _____
 Building: _____ Room: _____
 Inspected By: _____ Date: _____

Inspection Finding Categories:

- A. No items of safety or environmental concerns were identified.
- B. Items of safety or environmental concerns were identified.
- C. Uncorrected repeated safety or environmental items were identified.

Signs and Labels

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|---|--|
| | Lab refrigerators/freezers/microwaves labeled: <input type="checkbox"/> "No Food" <input type="checkbox"/> "No Flammables" (unless a flammable rated refrigerator is present) | |
| | Restricted areas are identified and secure. | |
| | Emergency contact information sign is posted on outside of lab door. | |
| | Hazardous Materials Emergency Information poster from EHS posted. | |
| | Appropriate Signs on lab entrance: <input type="checkbox"/> Caution – Radioactive Materials <input type="checkbox"/> Biohazard Symbols <input type="checkbox"/> Lasers | |
| | There are no signs present indicating hazards that no longer exist. | |

Training**# Compliance Items:**

| Category | Item | Comments (description, location, etc.) |
|----------|---|--|
| | Persons handling and generating hazardous waste are current on annual training. | List of personnel: |
| | Persons working with BBP are current on annual training. | List of personnel: |
| | On-the-job training completed (lab specific training). | |

Personal Protective Equipment (PPE)**# Compliance Items:**

| Category | Item | Comments (description, location, etc.) |
|----------|--|--|
| | Proper PPE available and matched to hazards: <input type="checkbox"/> Gloves <input type="checkbox"/> Lab Coates <input type="checkbox"/> Safety Glasses/Goggles <input type="checkbox"/> Face Shields <input type="checkbox"/> Respirators | |
| | Proper lab attire (no open toed shoes etc.). | |
| | Proper respirator use (if applicable). | |

Laboratory Work Practices**# Compliance Items:**

| Category | Item | Comments (description, location, etc.) |
|----------|---|--|
| | Gloves are removed before exiting lab. | |
| | Smoking and consumption of food and beverage in the lab are prohibited. | |
| | Food and beverages are not stored in laboratory areas. | |
| | Mouth pipetting prohibited. | |
| | Used needles/sharps are stored in appropriate sharps containers. | |
| | Fume hood or glove box is used for handling hazardous materials. | |
| | Vision panel in door to lab is free from obstruction. | |

Waste Handling

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|---|--|
| | No waste is disposed in the trash, sinks, or by evaporation. | |
| | Pink waste tags are affixed to each waste container when waste first introduced. | |
| | Wastes submitted to EHS, within 6 months after date of first filling of container. | |
| | Waste containers are in good condition and: <input type="checkbox"/> Free of leaks <input type="checkbox"/> Labeled <input type="checkbox"/> Closed <input type="checkbox"/> Segregated | |
| | Satellite Accumulation Area Requirements: <input type="checkbox"/> Labels Complete <input type="checkbox"/> Identify Constituents and Concentrations <input type="checkbox"/> Use Chemical Names <input type="checkbox"/> Weekly Inspection Form Complete <input type="checkbox"/> Segregation for incompatibles | |
| | Any special waste (biological, radioactive) is properly marked with special labeling. | |
| | Incompatibles not mixed together. | |
| | Generator does not treat chemical waste in lab. | |

Biosafety

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|--|--|
| | Point of use containers available for biomedical wastes at the benches. | |
| | Sharps containers available and not overfilled. | |
| | Sharps are handled appropriately: <input type="checkbox"/> no re-capping needles <input type="checkbox"/> no bending or breaking needles | |
| | Proper decontamination methods used (10% bleach or other EPA approved decontamination solution). | |
| | Biomedical waste containers do not contain non-biomed waste (trash chemicals, etc.). | |

Environmental Health and Safety Chemical Hygiene Laboratory Assessment

PI: _____ Department: _____

Lab Contact: _____ Lab Phone: _____

Building: _____ Room: _____

Inspected By: _____ Date: _____

Inspection Finding Categories:

- A. No items of safety or environmental concerns were identified.
- B. Items of safety or environmental concerns were identified.
- C. Uncorrected repeated safety or environmental items were identified

Compressed Gas Cylinders / Distribution Systems

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|--|--|
| | Unsecured cylinder | |
| | Cylinder cap in place when not in use or when being moved. | |
| | Regulator mounted on cylinder not in use | |
| | Cylinders in use or storage are secured in upright position | |
| | Incompatibles separated. | |
| | Hoses, tubing and regulators are in good working condition: <input type="checkbox"/> Cracks, leaks, damage <input type="checkbox"/> plastic tubing for flammable gases <input type="checkbox"/> Proper and intact labels. | |
| | Transportation in cylinder cart. | |
| | Excessive amount of flammable gases | |
| | Excessive amount of oxidizing gases | |
| | Excessive amount of toxic gases | |

General Appearances / Housekeeping

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|--|--|
| | Unobstructed Egress. | |
| | Empty chemical containers. | |
| | Workspace clutter and free of contamination. | |
| | Trash bins. | |

Chemical Fume Hoods / Exhaust Points

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|--|--|
| | Over-crowded. | |
| | Low flow or airflow blocked or restricted. | |
| | Performance check within last 12 months. | |
| | Sash open during use or unattended. | |

Reagent and Sample Storage

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|---|--|
| | Secondary containment used properly. | |
| | Incompatibles stored together: <input type="checkbox"/> Acids and bases <input type="checkbox"/> Acids and cyanides, sulfides or bleach <input type="checkbox"/> Oxidizers and flammables <input type="checkbox"/> Waster reactive and aqueous <input type="checkbox"/> Organic and Concentrated acids <input type="checkbox"/> Bleach and ammonium hydroxide | |
| | Degraded and expired containers. | |
| | Containers properly labeled and intact. | |
| | Flammable Liquid Storage: <input type="checkbox"/> 5 gal. or larger stored in flammable liquid storage cabinet <input type="checkbox"/> No more than 10 gal. stored outside of flammable liquid storage cabinet | |
| | Chemical spills (unattended) | |
| | Refrigerators: <input type="checkbox"/> Flammable materials <input type="checkbox"/> Cluttered | |

Safety Data Sheets

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|--------------------------------|--|
| | Hardcopies not available | |
| | No access to Internet / MSDS's | |



**Environmental Health and Safety
Fire and Life Safety Laboratory Assessment**

PI: _____ Department: _____

Lab Contact: _____ Lab Phone: _____

Building: _____ Room: _____

Inspected By: _____ Date: _____

Inspection Finding Categories:

- A. No items of safety or environmental concerns were identified.
- B. Items of safety or environmental concerns were identified.
- C. Uncorrected repeated safety or environmental items were identified.

Safety Equipment

Compliance Items:

| Category | Item | Comments (description, location, etc.) |
|----------|--|--|
| | Fire extinguishers are clearly visible and have unobstructed access. | |
| | Emergency eyewashes and showers are in good condition, clearly visible and have unobstructed access. | |
| | Emergency shower sprays will not contact electrical wiring or equipment. | |
| | Machine guards for hazards such as chain drives, belt drives, rotating shafts and pinch points are in place. | |
| | Emergency telephones are clearly visible and have unobstructed access. | |
| | Emergency shut-offs (ventilation, electrical and gas) are clearly visible and have unobstructed access. | |
| | First aid kits are clearly visible, unobstructed and well stocked. | |

Electrical Safety**# Compliance Items:**

| Category | Item | Comments (description, location, etc.) |
|-----------------|--|---|
| | All power cords and plugs are undamaged and in good condition | |
| | All extension cords and power strips are plugged directly into building electrical outlets. | |
| | Only extension cords with 3-prong plugs (grounded) are in use. | |
| | Extension cords are only used to power a single piece of equipment (unless manufactured with multiple outlets). | |
| | The current rating of all extension cords exceeds the combined maximum current draw of the equipment powered by them. | |
| | Extension cords are only used on a short-term basis and not as an alternative to installing additional building power outlets. (Cords attached to walls, benches, ceilings, etc. are evidence of long-term usage.) | |
| | All electrical equipment is properly grounded. | |
| | Manufactured electrical equipment (including extension cords) has not been modified from its original condition and is only being used in a manner intended by the manufacturer. | |
| | All power cords on the floor in travel paths are covered in a manner to protect them from damage. | |
| | No power cords are routed through doorways, above ceilings under floor coverings, through holes in walls or in any other manner that might expose them to damage. | |
| | Power supply or other high voltage connections are made using wire nuts and enclosed in junction boxes. | |
| | There is at least 36 in. (wide and deep) of clear floor space in front of all electrical panels. | |
| | There are no exposed energized elements (excluding data or other low voltage wiring). | |

Appendix B

Routine Annual Laboratory Assessment Notification



ENVIRONMENTAL HEALTH & SAFETY DEPARTMENT

Date:

To: *[Insert Department Head]*

From: *[Insert Assessment Supervisor's name]*, Coordinator

Subject: Laboratory Safety and Environmental Health Assessment

The Environmental Health and Safety Department will be assessing safety and compliance with environmental health programs in campus research and teaching laboratories. The assessment activities will include the following:

- A review of current laboratory conditions,
- Identification of potential safety issues,
- Identification of environmental health program compliance issues, and
- A report to the Principal Investigator and the Department Head identifying safety and environmental compliance issues.

The goals of these assessment activities are to promote safety in laboratory activities and aid Principal Investigators with laboratory safety and environmental health program responsibilities.

A copy of the Laboratory Safety and Environmental Health Assessment Program is available on the EHS Web Page. Appendix A of this Program contains the checklist EHS personnel will use during the laboratory visit. Departments and individual laboratories are encouraged to implement a self-inspection process described in this Program.

Department Heads are free to notify their department of the scheduled assessment activities. Please pass this notification along to Principal Investigators, Research Faculty and laboratory personnel.

[insert department name and location] laboratory assessments will begin on *[insert date and time.]* Feel free to contact me with any questions that you may have about the Laboratory Safety and Environmental Health Assessment Program.