Biology and Wildlife Chemical Hygiene Plan

This plan has been reviewed and approved by:

Laboratory Supervisor  
Denise Kind   8/16/16

Laboratory Manager  
Matthew Ashley  8/22/16

Department Chair  
Kris Hundertmark  8/23/16

Lab personnel receipt and acknowledgement (this record is kept by the Laboratory Supervisor and is available upon request).

I have read and understand this Chemical Hygiene Plan and agree to abide by the provisions outlined in it.

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<tr>
<th>Name</th>
<th>UA ID</th>
<th>Date</th>
<th>Signature</th>
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Biology and Wildlife Chemical Hygiene Plan

INTRODUCTION

The University of Alaska Fairbanks (UAF) and the Department of Environmental Health, Safety and Risk Management (EHSRM) encourages and supports all programs which promote the safety, health and well-being of UAF faculty, staff, students, participants in UAF-sponsored programs, visitors, the community and the environment. It is the goal of UAF to provide a safe working environment and to reduce injuries and illnesses to the lowest possible level. In keeping with this commitment, this Chemical Hygiene Plan (CHP) was developed as part of the Laboratory Safety program.

The CHP provides information to laboratory personnel with regard to protecting themselves from potential hazards associated with the use of chemicals. Biology and Wildlife’s plan also addresses potential hazards associated with the use of biological agents. Compliance with the provisions of the CHP is mandatory for all employees working in campus laboratories due to the requirements of the Occupational Safety and Health Administration (OSHA) standard on “Hazardous Chemicals in Laboratories” (Code of Federal Regulations 29 CFR 1910.1450). While these regulations pertain specifically to employees, UAF maintains that everyone working with hazardous materials in a campus laboratory must comply with the provisions of the CHP. Expectations with regard to safety and behavior, including consequences for non-compliance, are outlined in the UAF Safety Policy (Appendix 14). UAF’s Safety Policy and the consequences laid out in that document shall be followed. For minor infractions, a documented verbal warning will be given for the first instance, a written warning for the second, and a third violation may result in termination of lab privileges.

A variety of hazardous chemicals are used in research and teaching laboratories at UAF. Chemicals may cause injury or property damage if they are toxic, flammable, corrosive or reactive. The degree of personal risk associated with the use of these chemicals depends on how these substances are handled and stored, as well as on the specific reactions and processes in which the chemicals are used.

The objective of UAF’s general CHP is to provide uniform requirements for the safe use of potentially hazardous substances in UAF laboratories. This CHP has been adapted by Biology and Wildlife to reflect the unique tasks performed in our labs and to outline the methods of mitigating the risks associated with those tasks. This CHP is one component of our laboratory safety program. Policies may be added and existing policies may be made stricter. They may not be made less strict, nor may they be waived.

CONTACT INFORMATION

<table>
<thead>
<tr>
<th>Emergency</th>
<th>911</th>
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<tbody>
<tr>
<td>UAF Dispatch, non-emergency</td>
<td>474-7221</td>
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<tr>
<td>Facilities Services</td>
<td>474-7000</td>
</tr>
</tbody>
</table>

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EHSRM Contact Information
http://www.uaf.edu/safety/about-us/contact/
INDIVIDUAL CHEMICAL HYGIENE RESPONSIBILITIES

The responsibility for maintaining a safe laboratory environment lies with the Principal Investigator (PI) for the lab. In Biology and Wildlife teaching laboratories, the instructor of record for the course is the PI. Every individual in the lab is expected to conduct all operations and procedures in a safe and prudent manner.

Instructor (PI)
The instructor has responsibility for implementation of the CHP and the ensuring of safe conditions in his/her course. The instructor shall:
1. complete all required safety training, including those related to lab safety.
2. ensure that their TAs have completed all required training prior to the start of lab work, including training on the contents of this CHP document. Work with the B&W Laboratory Supervisor and Department Chair to address any deficiencies in a timely fashion.
3. ensure that students are always appropriately supervised while performing lab work, including work done outside of regular lab hours.
4. identify hazards and risks associated with each lab exercise. This includes performing the 29CFR1910.132 required hazard determination and maintaining required documentation as well as carrying out or arranging for Job Hazard Analysis (JHA) –assistance with this may be obtained from the Laboratory Supervisor.
5. maintain up-to-date written lab protocols, including measures that must be taken to ensure safety.
6. train TAs on the hazards of the procedures performed during lab and how to carry out the procedures correctly to minimize risk.
7. identify additional training that needs to be provided to TAs for procedures to be carried out in lab. Ensure that this training has been provided prior to the occurrence of the relevant laboratory exercise(s).
8. ensure that TAs properly train students and require students to follow the procedures outlined in this document as well as specific procedures for given lab exercises.
9. be familiar with emergency procedures and review them with TAs, including knowledge of the location and use of emergency equipment for the laboratory, as well as how to obtain additional help in an emergency.
10. be familiar with required reporting procedures for incidents requiring reporting, ensure that TAs know how and when to report incidents, and ensure that incidents are reported as required.
11. know current legal requirements concerning regulated substances.
12. identify new SOPS and training necessary for new laboratory activities.
13. in collaboration with the Laboratory Supervisor, review and evaluate the effectiveness of the laboratory SOPS at least annually and update as necessary.
14. request assistance from the Laboratory Supervisor and Laboratory Manager as necessary.
15. keep the Laboratory Supervisor and Laboratory Manager apprised of materials and safety needs, including waste pick-up and decontamination needs. If some or all of this is delegated to TAs, it is the instructor’s responsibility to ensure that TAs are doing so in an appropriate and timely manner.

Teaching Assistants
Teaching assistants shall:
1. complete required training, including those related to lab safety.
2. familiarize themselves with departmental lab procedures and available information (this CHP, Google Drive folder of equipment manuals and instruction manuals, B&W website safety page, and document binders in lab).
3. ensure that students are always properly supervised while performing lab work, including work done outside of regular lab hours.
4. meet regularly with the course instructor to discuss course issues and learn laboratory procedures. Follow appropriate procedures as given by the instructor and contained in this document during laboratory preparation, laboratory exercises with students and laboratory clean-up.

5. know the types of protective equipment available and use the proper type for each procedure.

6. use equipment and materials only for their designated purposes. Report equipment needs and problems to the Laboratory Manager.

7. ensure that procedures, including all necessary safety and waste management procedures, are followed at all times by students.

8. be familiar with emergency procedures, including knowledge of the location and use of emergency equipment for the laboratory, as well as how to obtain additional help in an emergency.

9. know and follow required reporting procedures following any incidents requiring reporting.

10. be alert to unsafe conditions and actions and notify the Laboratory Supervisor as soon as possible.

11. work with the instructor of record for the course to identify any additional training on equipment or procedures that would be beneficial or required, and work with the instructor, Laboratory Manager and Laboratory Supervisor to obtain training.

12. inform the Laboratory Manager and Laboratory Supervisor of any problems or needs related to lab management or lab safety in a timely fashion. This includes, but is not limited to:
   A. PPE restocking needs
   B. specialized PPE required for a particular procedure
   C. equipment problems
   D. spills and leaks
   E. need for waste disposal containers
   F. need for waste pick-up
   G. facilities problems and malfunctions

**Students**

Students shall:

1. carry out all operations in accordance with the provided guidelines and directions, including safety guidelines.
2. never work without appropriate supervision in lab.
3. be familiar with emergency procedures, including knowledge of the location and use of emergency equipment for the laboratory and how to obtain additional help in an emergency.
4. know the types of protective equipment available and using the proper type for each procedure.
5. be alert to unsafe conditions and actions and call attention to them so corrections can be made as soon as possible.
6. exercise good judgment.
7. look out for the safety of others in the lab.
8. dispose of all materials appropriately in accordance with instructions provided.
9. use equipment and materials only for their designated purposes.
10. notify their TA and/or instructor immediate in the event of an accident, spill, injury, damage to equipment, improperly functioning equipment, or other potential laboratory problem or hazard.
11. notify the instructor of any pre-existing health conditions that could be affected by working in the lab.

**Laboratory Supervisor and Laboratory Manager**

The Lab Supervisor shall:

1. complete all required safety training, including those related to lab safety.
2. prepare and provide department-specific training (B&W CHP Training, TA Orientation) at the start of each semester.
3. ensure that TAs are trained on proper use of emergency equipment available in the teaching labs.
4. ensure that the B&W Laboratory Safety agreement is up-to-date.
5. approve all chemical purchases to be made for courses.
6. assist instructors with performing the 29CFR1910.132 required hazard determination and maintaining required documentation as well as carrying out or arranging for Job Hazard Analysis (JHA).
7. assist instructors and TAs with development and implementation of SOPs and laboratory practices, including but not limited to identification of appropriate PPE and waste management plans for specific activities.
8. help instructors and TAs identify when additional training is necessary and help arrange for that training.
9. be available to go over procedures with and answer questions from instructors and TAs, upon request.
10. promote completion of training by obtaining training records and following up on deficiencies with individuals. Notify the Department Chair of any deficiencies that need to be addressed prior to the start of the semester.
11. keep abreast of legal requirements concerning regulated substances and communicate any changes to instructors and TAs.
12. seek ways to improve the overall CHP.
13. in collaboration with the IAB/B&W web manager, maintain the B&W Laboratory Safety website.
14. maintain a repository of equipment manuals, instruction manuals, protocols, procedures and other materials on Google Drive and provide access for individuals requiring it.
15. once per semester, carry out a thorough internal audit of all laboratory spaces in collaboration with the Laboratory Manager. Laboratory users shall also be given the opportunity to participate in audits. At least twice per semester, observe each lab to promote positive interaction with TAs and students.
16. serve as the Chemical Hygiene Officer (CHO) for the department. In this capacity, the Lab Supervisor shall
   a. collaborate with Safety Officers and CHOs from other departments and with EHSRM to stay abreast of current information and find ways to improve B&W’s safety program.
   b. assist PIs and other laboratory employees with development and implementation of standard operating procedures and practices, including providing consultation and information.
   c. keep abreast of legal requirements concerning regulated substances and communicate any changes to PIs and laboratory employees.
   d. perform an annual review of the CHP and all B&W lab documents (procedures, SOPs, flow charts, training requirements, etc.), update them, and make the updates available in the relevant lab rooms and electronic repositories.
   e. seek ways to improve the overall chemical hygiene program.

The Lab Manager shall:
1. complete all required training.
2. carry out weekly testing of emergency showers and eyewashes.
3. carry out weekly inspections of all B&W labs and prep areas, including inspection of PPE. Correct any problems, including re-stocking and replacement of PPE as needed.
4. provide additional PPE when it is identified as necessary and make sure that the users understand how to properly use it.
5. provide appropriate waste containers for chemical and biological wastes upon request.
6. arrange for disposal of chemical waste and biological waste that cannot be autoclaved once notified of the waste by TAs or instructors.
7. place orders for courses, with approval of all chemical purchases or purchases over a specified dollar amount requiring approval from the Laboratory Supervisor. Keep all necessary documentation.
8. inspect equipment at time of issue to a lab and upon return. At time of supply pick-up, make sure that user is familiar with all hazards and procedures for mitigating risk. Involve Lab Supervisor as necessary to provide training to users.

9. keep the Lab Supervisor informed of equipment and chemicals requested by courses so that safety concerns can be addressed when the equipment is picked up.

10. oversee chemical and equipment storage to ensure it is appropriate and in accordance with relevant regulations and guidelines.

11. assist with clean-up of spills and decontamination of space and equipment.

12. at least twice per semester, observe each course’s labs to ensure that procedures are followed and promote interaction with TAs and students.

13. actively seek ways to promote and improve laboratory safety and bring these to the attention of the Laboratory Supervisor.

**Office Manager**

The Office Manager shall:

1. complete all required training.

2. when receiving requests for laboratory space use by non-Biology and Wildlife groups, inform prospective users of the need to complete training requirements prior to space use.

3. notify the Laboratory Supervisor of all requests for lab use by non-Biology and Wildlife groups so that they can be contacted and training compliance can be confirmed.

**CNSM Dean and Biology and Wildlife Department Chair**

The Dean and Department Chair shall:

1. complete all required training.

2. promote instructor and TA awareness of their responsibility for the safety aspects of course instruction.

3. ensure that TA contracts (1) include time on contract for completion of required training prior to the start of classes and lab prep activities, and (2) specify the need to complete all training requirements, the timing requirements for completion, and the consequences for non-compliance.

4. apprise the Laboratory Supervisor of incoming TAs each semester or designate a responsible person to perform this task so that the Laboratory Supervisor can contact individuals in a timely fashion about training requirements.

5. assist in ensuring faculty and graduate student compliance with training requirements as needed, including involving University Administrators as needed.

6. assist in resolving disagreements upon request of the CHO.

7. assist in the enforcement of policies and contracts as needed.

8. bring to the attention of the CHO that could improve Biology and Wildlife’s CHP and lab safety program.

9. help promote a culture of laboratory and field safety.

10. provide support and resources to the CHO.

**Vice Chancellor for Research and Provost**

The Vice Chancellor for Research and the Provost shall

1. maintain laboratory safety as an institutional priority in both research and teaching.

2. provide support to CHOs when safety issues in research or teaching labs are not addressed by the instructor or faculty member responsible for that lab.
INFORMATION AND TRAINING

Information

The Laboratory Supervisor shall ensure that information needed to complete required training is provided at the time of a TA’s or instructor’s initial hire. People who are teaching in B&W lab spaces but are not hired by B&W (e.g. CTC, SSL) are expected to be provided with this information by their supervisor: the Laboratory Supervisor will confirm that training information and been provided and notify individuals and programs of any training needs or deficiencies prior to the start of lab usage. The Laboratory Supervisor shall ensure that TAs and instructors are notified of any training needs or deficiencies prior to each semester in which they teach, including need for refresher training and updates on prior training information.

Instructors shall also bear responsibility for ensuring that TAs comply with training requirements. If informed of training deficiencies by the Laboratory Supervisor, the instructor shall make sure that the training is completed by his/her TA in a timely fashion. Instructors shall ensure that information and training relevant to each laboratory exercise are provided to TAs prior to the occurrence of each laboratory exercise. TAs shall attend laboratory preparation meetings with instructors to receive training appropriate to specific laboratory exercises.

Instructors shall inform TAs of the following, or shall request assistance from the Laboratory Supervisor if desired:

2. the contents and availability of this CHP.
3. the Permissible Exposure Limits (PELs) for OSHA regulated substances (or other applicable exposure limits, such as those published by the American Conference of Industrial Hygienists).
4. methods and observations that may be used to detect the presence or release of a hazardous chemical; e.g., exposure monitoring conducted by EHSRM, visual appearance or odor of hazardous chemicals when being released, etc.
5. the measures TAs and students can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect individuals from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and PPE to be used.
6. signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.
7. the location of reference materials on the hazard, safe handling, storage and disposal of hazardous chemicals found in the laboratory (including, but not limited to, Safety Data Sheets (SDSs)).

Training

Laboratory personnel shall complete all the general trainings required of all UAF personnel and renew them as required:

1. Injury and Illness Prevention (replaces Office Safety – general)
2. Hazard Communication GHS
3. Title IX / Sexual Misconduct Prevention
4. Anti-Bullying
5. Employee Safety Orientation
6. Slips, Trips and Falls
7. Protection of Minors
   A. UA Policies and Procedures
   B. United Educators Awareness Training (through EduRisk)
8. Departmental Emergency Action Plan (DEAP) training (IAB - Murie)
In addition, Biology and Wildlife laboratory personnel (instructors and TAs) shall complete the following:
1. FERPA training (required of all who work with student records)
2. UAF Laboratory Safety
3. UAF Hazardous Waste Management
4. UAF Chemical Hygiene
5. UAF Drivers Training (if labs include driving university vehicles)
6. Biology and Wildlife Chemical Hygiene Plan (this document) and orientation (in-person)

Students must complete:
1. Have and AlcoholEdu Training

Additional training is required for advisors:
1. Academic Advisor Training

Supervisors are required to complete:
1. Supervisor Training

Researchers must also complete
1. Responsible Conduct in Research (requires renewal every three years)

Additional training modules developed by EHSRM are available, and may be required for certain laboratory activities. They include, but are not limited to:
- Bloodborne Pathogen
- Laboratory Sharps Safety
- Understanding Safety Data Sheets
- Formaldehyde
- Methylene Chloride
- Chloroform
- Phenol
- Hydrofluoric Acid
- Biosafety Cabinets
- Radiation Safety

CIRCUMSTANCES REQUIRING PRIOR APPROVAL

Prior approval from EHSRM is required in order to proceed when:
1. radioactive materials will be used.
2. recombinant DNA will be used or produced (exception: certain kits, such as Carolina’s pGLO bacterial transformation kit, do not require approval).
3. biological material of Biosafety Level 2 or greater will be used.
4. human blood or other fluids will be used that could expose individuals to bloodborne pathogens.
5. it is likely that exposure to limited concentrations could be exceeded or that other harm is likely.

Approval from the instructor, Laboratory Supervisor or EHSRM is required in order to proceed when:
1. there is a failure of any equipment used in the process, especially of safeguards such as chemical fume hoods.
2. members of laboratory staff or students become ill, suspect they or others have been exposed to a hazardous material, or otherwise suspect a failure of any safeguards.
3. a TA or instructor must work alone in the lab, regardless of the time of day or the day of the week.
4. working with Particularly Hazardous Substances, as defined by OSHA (see Appendix 10). PHSs include
   a) select carcinogens
   b) reproductive toxins
   c) acute toxins
   d) chemicals that can cause harm by direct absorption through skin
Prior approval from the Institutional Animal Care and Use Committee (IACUC) is required whenever live vertebrates will be used for a lab. This includes vertebrates that will be euthanized for use in a lab. This also may include observations carried out on vertebrates in the field. Approved protocols must be in place before the laboratory activities can occur.

Prior approval from the Institutional Review Board (IRB) may be required for operations in which students collect data using themselves or other people as the subjects. If required, any IRB approvals must be in place before the laboratory activities occur.

LABORATORY-SPECIFIC STANDARD OPERATING PROCEDURES (SOPs)

Instructors must include their own laboratory specific SOPs in this CHP. Instructors may ask the Laboratory Supervisor to write SOPs for them, but must provide all information necessary for the preparation of the SOP to the Laboratory Supervisor in a timely fashion as requested.

Examples of procedures for which SOPs are needed include, but are not limited to:
1. operation of laboratory equipment that could pose a hazard, including but not limited to
   - electrophoresis equipment
   - cryocooling equipment
   - Bunsen burners
   - compressed gas cylinders
   - lasers
   - atomic absorption spectrometers
   - muffle furnaces
   - freeze-dryers
2. operations or materials posing a special hazard, including but not limited to
   - perchloric acid
   - pyrophorics
   - distillations and/or extractions
   - handling infectious agents
   - working with microbiological cultures, even if categorized as level 1 agents
   - ethidium bromide
3. operations that use a chemical listed in the chemical inventory as requiring an SOP
4. neutralizing non-contaminated acid wastes
5. specific procedures for any operations that are to be conducted in fume hoods
6. collection and processing of chemical and biological wastes

SOPs are step-by-step instructions for conducting the procedure and must include
1. training requirements for lab personnel. Training documentation must include the name of the trainer, the topics covered and the date of the training.
2. information on the specific hazards posed by the chemicals, biologicals and/or equipment used in the procedure.
3. information on the personal protective equipment (PPE) needed during the procedure, including specific information on PPE types (e.g. glove type and thickness) needed.
4. a step-by-step description of the process.
5. first aid measures.
6. waste collection and disposal instructions.

SOPs can be found at the end of this CHP.

ENGINEERING CONTROLS AND LABORATORY VENTILATION

General laboratory ventilation is normally designed to provide a minimum of eight air changes per hour. This flow is not necessarily sufficient to prevent the accumulation of chemical vapors in the lab.

Fume hoods
Laboratory work shall be conducted in a fume hood, glove box or similar device when:

1. Procedures call for work with toxic substances which are volatile; i.e., can evaporate at normal temperature and pressure.
2. There is a possibility that the action level or PEL (Personal Exposure Limit) will be exceeded.

The way the hood is used will determine the degree of protection it will provide. Each employee is responsible for implementing the following work practices when using a hood. The TA or instructor for a lab section is responsible for ensuring that students implement the following work practices when using a hood, and the instructor for the course is responsible for ensuring that the TA is properly trained to supervise the students.

1. Continually monitor air being drawn into the hood. The hoods in the Biology and Wildlife teaching labs have electronic monitors and will alarm if the air flow is too low or too high (Fig. 3). If the display is blank and/or the green light is not lit, do NOT proceed with your work. Notify the Laboratory Manager and Laboratory Supervisor at once, or notify Facilities Services directly if they cannot be reached. Work may only occur in a properly functioning hood.

![Figure 3. Fume hood monitors showing acceptable air flow readings.](image)

2. Operate the hood at a sash position that allows no more than a 10-12 inch opening of the fume hood. This helps to ensure optimum protection when conducting operations in the hood. The hood should never be operated when opened above the maximum operational opening marked on the hood.

3. Avoid using the fume hood for storage of bottles and equipment, especially along the back wall of the hood. This impedes air flow.

4. Any apparatus that must be housed in the hood for use should fit completely inside the hood. If appropriate, elevate the apparatus on blocks (at least 2 inches off the bench top) to allow air to flow freely around and beneath the item.

5. Manipulations within the hood should be performed at least 6 inches inside the face of the hood or as far towards the back of the hood as possible. This minimizes the possibility of contaminants escaping from the hood due to turbulent air flow.

6. Minimize air turbulence across the face of the hood from fans or excessive movement around the hood face. Avoid excessive arm movements that could create air turbulence.

7. Avoid walking close to a fume hood when someone else is using it.

8. Fume exhaust hoods do not provide adequate protection for all operations involving toxic materials. A higher level of containment should be used for procedures where exposure to even small amounts of the chemical can be serious. If you are in doubt about the level of containment needed for your operation, ask the Laboratory Supervisor well in advance of beginning work.

9. Fume hoods do NOT provide an appropriate location for work with microbiological organisms. Fume hoods do not properly contain them, and may cause their accidental release. Fume hoods also draw air in over cultures and increase the likelihood of contamination. Do NOT work with microbiological cultures in a fume hood. If you need help working safely with microbiological cultures, contact the Laboratory Supervisor.
Fume hoods shall be evaluated annually by EHSRM to verify that adequate airflow is maintained through the hood face, there are no leaks in the ductwork, the sash cable integrity is maintained, and the stack height and exhaust velocity are sufficient. Check for a current sticker on the side of the fume hood or other local exhaust equipment.

1. The date should not be over a year old. If it is, contact the Laboratory Manager so that a face velocity test can be scheduled with EHSRM.
2. Face velocities should be between 80 and 120 feet per minute (fpm).
3. Contact the Laboratory Manager and Laboratory Supervisor if you suspect a hood is not working. Contact Facilities Services if you cannot reach them. Do not use a hood that does not appear to be functioning properly, as it will not afford the correct protection.

In the event of a fume hood failure or low-flow alarm, discontinue all fume hood operations and, only if it is safe to do so, place lids on containers, lower the hood sash and secure reactions that may be generating hazardous emissions.

1. Contact the Laboratory Manager and Laboratory Supervisor to report the problem and obtain assistance. You may also contact Facilities Services. After work hours, the Facilities Services number is forwarded to Emergency Dispatch so that 474-7000 is responded to 24 hours.
2. If the hood failure poses imminent danger, leave the lab immediately and call 911.

Snorkel hoods

1. Snorkel hoods shall be used to ventilate work spaces whenever recommended for a given protocol or procedure. In general, their use is limited to dissections of non-preserved specimens and specimens preserved in non-formalin-based holding solutions and the ventilation of other non-hazardous fumes. **Snorkel hoods do NOT provide adequate protection for formalin/formaldehyde-based solutions or other hazardous materials.** Follow the ventilation requirements in the appropriate Safety Data Sheet(s) and Standard Operating Procedures (when applicable).
2. Recommended procedure
   - move tables under snorkel hoods if not already in that position
   - adjust hoods so that they are low to the work area but do not interfere with the work
   - turn hoods on by moving the two silver toggle switches in the lab to the “up” position. In 203 and 211, these are on the back pillar in the room. In 303, these are on the side (north and south) walls of the room.
   - check that air flow is occurring through all hoods that are in use. There are on/off adjustment valves on the hood tubing; these should be opened to allow air flow as needed.
   - keep hoods on throughout work and clean-up period. Turn off when work and clean-up are completed.

Respirators

1. Because of the difficulty and expense associated with respirators, procedures that would require the use of a respirator should be replaced with a safer, less hazardous alternative in Biology and Wildlife teaching labs if at all possible.
2. Instructors wishing to carry out a procedure that would require the use of respirators by students and TAs must obtain prior approval from the Department Chair for the expense (of the respirators themselves and the required medical examinations), and must consult with the Laboratory Supervisor to determine (1) whether a safer alternative exists and (2) to be sure respirators can be made available and all steps in the approval and training process completed prior to the lab.
3. Respirators require a medical evaluation, training and fit testing. Procedures are outlined in the UAF Respiratory Protection Policy. Consult the EHSRM Industrial Hygienist for assistance. The use of respirators without prior approval and training by the Industrial Hygienist is prohibited.

PERSONAL PROTECTIVE EQUIPMENT (PPE) AND APPAREL
Carefully inspect all PPE prior to use. Do not use defective equipment.

Eye Protection
All individuals working in a laboratory shall wear eye protection appropriate for the procedure(s) being conducted (e.g. safety glasses, chemical-resistant goggles, chemical face shield, UV face shield, etc.). Eye protection shall be worn at all times in laboratories where chemicals are being used.

2. Ordinary prescription glasses are not considered safety glasses. Safety glasses must be worn over prescription glasses, or prescription safety glasses may be worn.
3. Contact lenses may be worn as long as additional ANSI 87.1-2015-compliant eye protection outlined above is used and the wearing of contacts is compatible with the hazard.
5. Biology and Wildlife has goggles designed for over-glasses wear, but these must be specifically requested by the TA. TAs must note how many students require over-glasses goggles and request a sufficient quantity from the Laboratory Manager.

Gloves
When working with corrosive, toxic, allergenic or sensitizing chemicals, rough or sharp-edged objects, very hot or very cold materials, gloves made of material known to be resistant to the substance shall be worn. No one glove can protect against all hazards.

1. Cloth gloves can be used to protect against light abrasive materials and moderate temperature changes. They are inappropriate for use around liquids.
2. Synthetic or rubber gloves protect against corrosives, solvents and toxins. Consult the SDS or glove manufacturer’s glove selection charts to determine which type of glove is appropriate for a given chemical, or contact the Laboratory Manager or Laboratory Supervisor for assistance. Some solvents permeate particular glove types very rapidly.
3. Leather gloves protect against sparks, heat and rough abrasives, and are often used for tasks such as welding.
4. Autoclave gloves protect against heat. They are used for loading and unloading the autoclave and handling hot materials that have been autoclaved.

Clothing
Clothing should provide protection from laboratory hazards and avoid creating additional hazards.

1. A full body-length rubber, plastic or neoprene apron appropriate for the material being handled should be worn if there is risk of splash or spill when working with large volumes of hazardous chemicals. Hazards of this type must be pre-approved.
2. Low-heeled shoes with fully covered uppers shall be worn at all times in the laboratory. Shoes or sandals with open toes or shoes with mesh covered uppers shall not be worn.
3. Long pants and long sleeves should be worn when working with or around chemicals.
4. Long hair should be held in place behind the head.
5. Loose clothing, especially loose trouser legs and sleeves, should not be worn in the laboratory.
6. A lab coat that is resistant to the hazard being worked with shall be worn (e.g. a chemical resistant lab coat when working with chemicals, a fire-resistant lab coat when working around fire hazards, etc.)
7. Clothing made of synthetic materials is strongly discouraged, and prohibited if specified in the SOP for a procedure.

UV Protective Face Shields
1. UV Protective face shields should be used when working with gels on a UV light box if the protective cover for the light box must be removed to excise bands or carry out other work with the gel.
2. When the situation warrants UV face shielding, skin should be protected from UV by wearing a long-sleeved lab coat and appropriate gloves.

Care and maintenance of PPE
1. Personal protective clothing and equipment shall be used and maintained in a sanitary and reliable condition and shall be cleaned regularly to avoid spreading contamination.
   - Laboratory coats shall never be washed at home.
   - Non-contaminated laboratory coats can be washed in 215 Murie. Contact the Laboratory Manager if you have lab coats that require washing.
   - Consult with the Laboratory Manager regarding treatment of lab coats contaminated with chemicals or biological materials.
2. Remove laboratory coats before you leave the laboratory to prevent spreading contamination to other areas. Laboratories with lab coats have a designated area to hang them. Laboratory coats shall never be hung on the hooks in the front of the room; these are reserved for students’ personal belongings and must remain uncontaminated.
3. Do not wear gloves outside the laboratory. If you must carry a hazardous substance from one room to another and need to wear a glove to hold the container, the other hand should be ungloved. The ungloved hand should be used when door handles must be touched.
4. Do not wear contaminated or potentially contaminated shoes outside the laboratory.
5. Regular clothing that is suspected of being contaminated shall be evaluated by chemical hygiene staff (B&W Laboratory Supervisor) to determine whether or not it can be decontaminated or if it should be disposed. Contaminated clothing shall not be washed with or come into contact with other personal laundry.

LABORATORY SAFETY RULES AND REGULATIONS

General rules for laboratory work with chemicals
1. Regular work schedules should be followed unless a deviation is authorized by the laboratory supervisor, laboratory manager or instructor. Employees shall not work alone after hours. No one may work alone on hazardous tasks. Students may never work unsupervised.
   - Arrangements should be made between individuals working in separate laboratories outside of regular working hours to crosscheck each other frequently. Preferably, workers who are alone in a lab should have an emergency alert device to call for help in the event of an emergency. Contact the Laboratory Supervisor for more information.
   - Procedures involving any hazardous materials or procedures shall not be undertaken by an employee who is alone in the laboratory. This includes all operations with chemical hazards (corrosives, flammables, toxics, reactives, etc.), electrical hazards, and physical hazards (machinery, sharp tools, asphyxiants, etc.).
   - If there is any question about whether a procedure or material is hazardous, the Laboratory Supervisor shall be consulted in advance of performing the work.
2. Students must be supervised by an appropriate individual whenever working in the laboratory.
• If students need to complete work outside of their scheduled lab period, the TA and instructor are responsible for ensuring that appropriate oversight is provided. The TA and/or instructor are generally responsible for providing oversight themselves.
• A TA or instructor may make arrangements with the Laboratory Manager or Laboratory Supervisor for one of them to oversee a student if necessary and possible.
• If someone other than the instructor, TA, Lab Manager or Lab Supervisor is designated to supervise work outside of lab time, the Lab Supervisor must be notified in advance so that the person’s training can be confirmed before they serve as a supervisor. If there is insufficient time to confirm and/or complete training, the person shall not be allowed to serve as a supervisor.

3. Unauthorized experiments shall not be performed.
4. Plan and review all safety procedures before beginning any operation.
5. Follow standard operating procedures (SOPs) at all times.
6. Wear appropriate laboratory attire and appropriate PPE at all times.
7. Always review the SDS and container label before using any chemical.
8. Use appropriate ventilation when working with hazardous chemicals.
9. Chemicals must be stored appropriately based on hazard categories. Chemicals should be kept secured in locked chemical storage cabinets when not in use.
10. Pipetting should never be done by mouth. Use mechanical devices, such as pipet bulbs, pipet wheels, pipet pumps, electric pipettors or other pipetting devices.
11. Wash hands with soap and water immediately after working with any laboratory chemicals, even if gloves have been worn. Never use solvents to wash skin.
12. Eating, drinking, chewing gum, applying cosmetics and taking medicine in laboratories and lab prep areas is strictly prohibited.
13. Smoking is prohibited in all UAF facilities.
14. Food, beverages, cups and other eating or drinking utensils shall not be stored in areas where hazardous chemicals are stored or handled.
15. Laboratory refrigerators, ice chests, cold rooms and ovens shall not be used for food storage or preparation.
16. Eating and office areas are separated from laboratory and chemical storage areas. Hazardous chemicals may not be stored in eating or office areas at any time.
17. Maintain situational awareness – be aware and alert of things going on around you at all times.
18. Make others aware of any special hazards associated with your work.
19. Notify the instructor of any chemical sensitivities or allergies, and consult with the Laboratory Manager, Laboratory Supervisor or EHSRM Industrial Hygienist for assistance with identifying protective measures or alternatives.
20. Report all injuries, accidents, incidents and near misses to the Laboratory Supervisor, Laboratory Manager, and instructor for the course.
21. If an injury or accident requires an immediate response, call 911 to request emergency assistance. Follow appropriate reporting procedures once the emergency is resolved. See Appendix 9.
22. If an injury requires medical attention, follow the appropriate reporting procedures. See Appendix 8. Consult the Laboratory Supervisor, Laboratory Manager, or EHSRM for assistance with reporting.
23. Unauthorized persons are not allowed in the laboratory. In teaching labs, any individuals not enrolled in the course or involved in teaching it are considered unauthorized.
24. Report unsafe conditions in the lab to the course instructor, Laboratory Supervisor and Laboratory Manager. If an unsafe condition poses an emergency, call 911. If a condition is not an emergency but requires prompt attention, contact EHSRM or Facilities Services as appropriate to report it and request assistance. Be prepared to provide details on the location and nature of the problem.
25. Properly dispose of chemical wastes.
- The Laboratory Supervisor and Laboratory Manager must be notified in advance when a lab will produce chemical waste. They will provide appropriate waste containers and secondary containment as necessary.
- When wastes need to be picked up, they should be reported to the Laboratory Manager.

26. Properly dispose of biological wastes. See Appendix 3 and Appendix 4.
27. Contact the course instructor and Laboratory Supervisor with all safety questions or concerns.

Housekeeping
1. Proper housekeeping includes appropriate labeling and storage of chemicals, safe and regular cleaning of the facility, and proper arrangement of laboratory equipment.
2. All work areas, especially laboratory bench tops, should be kept clear of clutter.
3. All aisles, corridors, stairs and stairwells shall be kept clear of chemicals, equipment, supplies, boxes and debris.
4. Equipment and supplies shall be cleaned thoroughly and appropriately by the students and/or TA following a lab activity and put away properly.
5. All wastes and trash shall be collected and disposed of appropriately and promptly. The Laboratory Manager will assist with waste disposal.
6. Storage of empty cardboard boxes in the lab should be avoided. If some cardboard must be stored for use in laboratory exercises, the boxes must be flattened and placed in an appropriate storage location. A limited number of cardboard boxes are kept in 209 Murie and 007 Murie for use in transporting equipment.

General rules for laboratory work with biological agents

In addition to the general rules for laboratory work, the following rules apply to any procedure that uses biological materials (e.g. live animals, preserved animal specimens, fresh animal specimens, microbiological specimens, animal or human body fluids).

1. All materials must be collected and disposed of properly.
2. Biological agents must be stored securely to prevent unauthorized access and accidental exposure.
3. Non-preserved animal tissue (non-human, including non-human animal blood) must be collected in incineration bags or containers. It shall be labeled with the date of collection. The Laboratory Manager shall be notified of the start date and end date of collection of materials so that incineration pick-up can be arranged. If the materials must be stored pending pick-up, they should be placed in the chest freezer in Murie 307 to prevent them from rotting prior to pick-up. Bags shall be securely closed to prevent leaks and placed in secondary containment as needed.
4. If working with human blood or other non-preserved human tissues
   - Bloodborne Pathogen (BBP) training must be successfully completed prior to the start of the laboratory work. BBP training can be scheduled with the EHSRM Industrial Hygienist. Contact the B&W Laboratory Supervisor to make appropriate arrangements.
   - an exposure control plan must be approved by the EHSRM Industrial Hygienist prior to the start of laboratory work. Previously utilized exposure control plans used in Biology and Wildlife labs are available from the Laboratory Supervisor or Laboratory Manager for use as a starting point.
5. Preserved specimens can be bagged and boxed for pick-up. The Laboratory Manager should be notified of the start date and end date of collection of materials so that pick-up can be arranged.
6. Microbiological specimens (e.g. tube cultures, plate cultures) must be autoclaved before tubes are cleaned or plates disposed of. An autoclave flow chart is included as Appendix 4 of this CHP. Specific procedures for autoclaving waste are detailed in the Autoclaving SOP.
7. When working with microbiological agents, the lowest Biosafety Level organism that will be effective for the laboratory activity should be chosen.
8. Any use of live vertebrates or vertebrates that will be euthanized for a lab requires IACUC approval. The IACUC approval process should be initiated well in advance of the lab activity.

**EMERGENCY EQUIPMENT**

- Know the location and proper use of safety equipment. TAs may request refresher training as needed, and may be asked to complete refresher training annually.
- Access to emergency equipment, showers, eyewashes, fire extinguishers, exits and circuit breakers shall never be blocked or obstructed.
- Use of any emergency equipment shall be reported to the Laboratory Supervisor and other appropriate personnel immediately after the incident is resolved to enable follow-up reporting, prevention of recurrence, and/or replacement of used materials.

Emergency eyewashes and showers

OSHA (29 CFR1910.151) states:

> Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

The ANSI standard Z358.1 recommends that

1. The safety shower and eyewash be within 10 seconds of the work area.
2. The equipment must be installed on the same level as the hazard (i.e. access should not require going up or down stairs or ramps).
3. The path of travel from the hazard to the equipment should be free of obstructions and as straight as possible.
4. Eyewash stations and showers will be tested annually (by Facility Services) to determine pressure and flow rates.
5. Equipment is tested weekly (by the Laboratory Manager in Biology and Wildlife) to ensure the delivery of clear, tepid, debris-free water. These weekly tests are documented in a written log. In Biology and Wildlife, these logs are kept on a clipboard with the SDS in each lab.
6. Visible signage is provided indicating the location of all emergency equipment.

The showers and eyewashes in the Murie Building labs are connected to an alarm system that notifies UAF Emergency Dispatch of their activation. **TAs and/or instructors SHALL NOT demonstrate the use of the shower and/or eyewash without first arranging to have the alarm-out function disabled.** This can be arranged through the Laboratory Manager or Laboratory Supervisor. Any fines or fees arising from a false call-out due to demonstrations or other inappropriate use shall be charged to that course’s lab fee.

If a shower or eyewash is used to respond to an emergency, someone in the lab shall call 911 to identify the nature of the emergency and request assistance. The TA should immediately designate a student to do this. **In Biology and Wildlife, any incident requiring the use of a shower or eyewash is considered a medical emergency, and 911 should be called.** See the emergency response flow charts in Appendix 8. The TA or instructor present in the lab shall provide EMTs with full details on the hazard(s) the victim was exposed to, including copies of the Safety Data Sheets for all chemicals involved.

**Fire Extinguishers**

UAF’s policy is to have employees and students exit the building in the event of a fire, not remain behind to attempt to fight the fire. However, it is recognized that individuals who are properly trained and equipped may be able to put out a small fire in a piece of equipment, thus reducing the amount of property damage to the equipment and surrounding lab.
Although Biology and Wildlife teaching labs are not high fire hazard areas, they are equipped with fire extinguishers. Fire extinguishers are to be used only by trained personnel. Individuals who have current in their training may follow their training to extinguish a small fire. Untrained individuals should not attempt to extinguish a fire, but should exit the building. In the process of exiting, the fire alarm pull station should be activated to warn others of the danger and alert the fire department.

**Propane Gas Shut-Off Valves**

In the event that you smell propane and may have a possible propane leak, immediately turn off all possible sources of ignition (open flames, hot plates, magnetic stir plates, etc.). Turn off the propane to the room. The shut-off valve for each room is located behind a clear Plexiglas plate in the front of the room (Fig. 1). The Plexiglas slides off so that the valve can be accessed (Fig. 2). Turn the valve handle so that it is at a 90 degree angle to the pipe (Fig. 3) to shut off the propane. Contact the Laboratory Supervisor immediately for assistance. If the Lab Supervisor is unavailable, contact EHSRM directly for assistance. If you believe that the leak poses an immediate threat of fire or explosion, evacuate the area and call 911 immediately. Do not resume work until it is safe to do so.

**Emergency Fire Blankets**

1. Each teaching lab (202, 203, 206, 211, 302, 303, 306 and 309 Murie) is equipped with a fire blanket that is hung on the wall in a protective bag.
2. Fire blankets may be used to smother a small fire or flames on an individual. If a small fire cannot be immediately extinguished, exit the building and pull the fire alarm. If an individual’s clothing or hair catches fire, extinguish the flames and call 911 immediately.
3. Things to remember:
   - Lower the blanket onto the fire carefully to avoid spreading the fire. Be careful not to spread the fire. Leave the blanket in place to completely smother the fire. Avoid beating a fire with the blanket, as this can fan the flames and make the fire worse.
   - If a person’s clothing or hair catches fire, the person should drop to the ground and roll to smother the flames. The blanket can then be used to smother the flames completely. Do not wrap a standing person in a fire blanket, as this can create a chimney effect that intensifies the flames.
   - If a person’s clothing or hair catches fire, the emergency shower can also be used to extinguish the flames if there are not any water-incompatible materials involved.
4. The fire blanket may also be used
   - to provide a privacy screen for someone who must use the emergency shower.
   - to provide warmth to an injured person to minimize shock.
Emergency Telephones

In an emergency, a cell phone can be used to call 911. An emergency phone is located in the south (front) lobby of the Murie building, between the outer and inner doors of the entry. If 911 must be called and a cell phone is not available, someone should be directed to use this phone to call 911. Be prepared to provide details on your location and the nature of the emergency.

The emergency telephones are also set up to allow on-campus and local telephone calls, so they can be used to reach departmental personnel, EHSRM, or OIT when non-emergency assistance is needed.

CHEMICAL MANAGEMENT

Chemical Procurement

1. TAs or instructors needing a chemical shall request the chemical from the Laboratory Supervisor and Laboratory Manager far enough in advance to allow it to be obtained. The full name of the chemical, quantity needed, date needed, and what it will be used for should be provided. All purchases of chemicals shall be reviewed and approved by the Laboratory Supervisor before the purchase is made. All purchases of chemicals shall be made by either the Laboratory Manager or Laboratory Supervisor.
2. Only the minimum amount of the chemical needed to perform the planned work should be ordered.
3. The Laboratory Supervisor must be notified ahead of time (minimum 1 week in advance) of chemicals that are being brought to teaching labs from research labs to allow time to make sure that appropriate PPE, waste handling measures, and SDS are in place.
4. Information on proper handling, storage and disposal should be provided to those who will be involved before a chemical is received or used. Proper protective equipment and handling and storage procedures shall be in place before receiving a shipment.
5. Only containers with proper labels identifying the chemical and its hazard should be accepted. Beginning June 1, 2016, all container labels must be compliant with the Globally Harmonized System (GHS).
6. Shipments with breakage or leakage should be refused or opened in a chemical fume hood using appropriate precautions and PPE.
7. When a shipment containing chemicals is received at the B&W Office, the box shall be placed unopened into the chemical resistant receiving bin. The Laboratory Manager shall be notified immediately. If not available, the Laboratory Supervisor shall be notified immediately.
8. Chemical shipments shall be dated upon receipt. TAs and instructors should use older materials before opening newer ones.
9. Upon receipt of a chemical, the following will be done by the Laboratory Manager or Laboratory Supervisor:
   A) The box shall be visually inspected and opened in an appropriate location
   B) the container holding the chemical shall be inspected
   C) the container shall be dated and labeled appropriately
   D) the chemical shall be entered into the inventory database
   E) the current SDS shall be linked to the inventory and printed for the lab(s) where the chemical will be stored and/or used
   F) the chemical and SDS shall be placed in the appropriate storage location.

Chemical Storage

1. Chemicals should be separated and stored according to hazard category and compatibility. SDS and label information should be consulted as needed. All chemicals should be stored in locked
cabinets when not in use regardless of hazard category. All hazardous chemicals must be stored in locked cabinets when not in use.

2. Maintain existing labels on incoming containers of chemicals and other materials.

3. Peroxide formers should be stored away from heat and light with tight-fitting, nonmetal lids. They shall be labeled with peroxide test date, result and initials of tester, and tested at least annually.

4. All containers used to hold chemicals must be labeled with chemical name, chemical concentration, hazard warnings, and date received or mixed.

5. Hazardous liquids should be stored in secondary containment.

6. Open shelves used for chemical storage must be secured to the wall and have 3/4 inch or more lips.

7. Incompatible chemicals should be kept separate during transport, storage, use and disposal. Consult the SDS.

8. Oxidizers, reducing agents and flammables should be stored separately to prevent contact.

9. Chemicals should not be stored in chemical fume hoods, on the floor, in areas of egress, on the benchtop, near heat sources, or in direct sunlight. Chemicals may be in chemical fume hoods or on benchtops while in use or between lab prep and lab sessions, but must be in appropriate secondary containment as needed and appropriately labeled with contents and hazards.

10. Laboratory-grade, flammable-rated refrigerators and freezers are required to store sealed chemical containers of flammable liquids that require cool storage. Flammable liquids may not be stored in the refrigerators in Biology and Wildlife labs.

11. Corrosives should be stored below eye level.

12. Flammable chemicals should be stored in the flammables cabinet when not in use. They must be in a spark-free environment and in approved containers. When transferring flammables from drums in the hazmat storage room, grounding and bonding must be used to prevent static buildup. Storage shall be limited to quantities specified in Appendix 11.

Chemical Handling

1. A risk assessment should be conducted prior to beginning work with any hazardous chemical for the first time or when scaling up a procedure to use larger quantities of a hazardous material. Contact the Laboratory Supervisor for assistance.

2. Read all SDS and label information before using a chemical for the first time, if it has been a while since you last used the chemical, or if the SDS has been updated by the manufacturer.

3. TAs and instructors must ensure that proper administrative controls (e.g. correct procedures), engineering controls (e.g. ventilation) and PPE are in place.

4. TAs and instructors are responsible for ensuring that students utilize the appropriate controls and PPE throughout the experiment. Controls and PPE must be used appropriately to be effective.

5. The Laboratory Supervisor should be consulted whenever there are any questions about the use of a chemical or a combined set of chemicals.

6. Appropriate containers for properly collecting and storing waste until pick-up must be obtained and in place before work begins. TAs and instructors should contact the Laboratory Supervisor for assistance in determining proper waste handling procedures prior to setting up the lab activity.

7. Spill control and clean-up measures must have been considered and materials available before work begins. TAs and instructors should contact the Laboratory Supervisor for assistance.

8. TAs and instructors are responsible for ensuring that students follow waste segregation and collection procedures.

Chemical Inventory

1. UAF uses an online chemical inventory system that stores all information electronically. Go to http://www.uaf.edu/safety/ehs-assist to learn about the system.

2. The B&W Laboratory Supervisor and Laboratory Manager are responsible for maintaining the B&W inventory. If you have questions about the availability of a particular chemical, contact the
Laboratory Supervisor. An up-to-date hard copy of the inventory is available in the MSDS/SDS binder in the front of each lab.

3. A current copy of the inventory for each teaching lab and prep room is available at the front of the SDS/MSDS binder in the front of the room.

4. If your class has chemicals that you are no longer using, please notify the Laboratory Supervisor and Laboratory Manager so that they can be removed from your lab.

Chemical Transport
1. TAs and instructors are not to transport chemicals from building to building. Ask the Laboratory Manager or Laboratory Supervisor for assistance.
2. Use secondary containment, such as bins and buckets, when transporting chemicals
3. Use a break-resistant transport container when transporting chemicals outside of the laboratory or between stockrooms and laboratories.
4. The outside of the secondary container must be free of any hazardous material so that personnel can carry the package safely between buildings without wearing gloves. Appropriate gloves shall be kept on the cart for protection of transporter in case of a spill during transit.
5. Wear safety glasses or goggles while transporting chemicals in secondary containment. Goggles should be worn when transporting liquid chemicals in containers larger than 500 mL.
6. Avoid transporting chemicals through high-traffic areas.
7. Never transport chemicals in your personal vehicle or in a departmental vehicle. Call EHSRM Hazmat Division for assistance at 474-5617 or 474-7889.

Chemical Transfer
1. Use adequate ventilation (such as a fume hood) when transferring even a small amount of a particularly hazardous substance (see Appendix 10).
2. When transferring flammable chemicals from one container to another, make sure that there are no ignition sources in the area. If transferring from large containers (2 gallons or more), appropriate grounding and bonding should be used to disperse static charge. Consult the Laboratory Supervisor or Laboratory Manager for assistance. They will follow the B&W grounding and bonding SOP.
3. Large quantities of chemicals should not be kept in labs or prep rooms. In particular, drums and multi-gallon containers are not allowed. Contact the Laboratory Supervisor if you need to use large quantities of a chemical for lab.
4. The container a chemical is being transferred to must be appropriately labeled – including full name of chemical, concentration (if appropriate, e.g. X% (w:v)), and hazards – before transfer occurs.
5. Following a lab, any leftover chemicals must be disposed of properly or transferred to an appropriately labeled container (chemical name, concentration if appropriate, UAF color code, NFPA rating, hazard statements) and stored correctly. Chemicals should NEVER be returned to the original container as this poses the risk of contaminating the entire container of chemical.

Chemical Shipping
1. Under no circumstances may TAs or instructors ship chemicals. If shipping is necessary, contact the Laboratory Supervisor or EHSRM for assistance.

COMPRESSED GAS SAFETY
Compressed gases present a number of chemical, physical and health hazards. Improper handling and use can cause structural damage, severe injury and possibly death. Compressed gas safety training, if available from EHSRM, is required for TAs and instructors who will work with compressed gases or who work in labs where compressed gas cylinders are housed.
**Receiving and Storage**

1. If compressed gases are needed for a lab, contact the Laboratory Manager and Laboratory Supervisor. They will arrange for delivery and pick-up of cylinders.
2. As soon as use of the gas is completed, notify the Laboratory Manager that the cylinder is ready for pick-up. A rental fee is charged on the gas cylinders obtained from Facilities until the cylinder is returned.
3. Cylinders should not be accepted unless the cylinder contents are clearly labeled. Cylinders labeled with only a color code shall not be accepted.
4. Do not accept cylinders which are damaged or do not have a valve protection cap.
5. All gas cylinders shall be secured in an upright position in racks, holders, or clamping devices, with straps or chains placed at 1/3 and 2/3 the tank height.
6. When cylinders are grouped together, they should be individually secured and conspicuously labeled on the shoulder area. Labels must be readily visible.
7. Never place oxygen cylinders near highly combustible materials, especially oil and grease, near stocks of carbide and acetylene or other fuel gas cylinders, nor near any other substance likely to cause or accelerate a fire.
   a) Systems and components used for other gases and purposes must never be used for oxygen or interconnected with oxygen.
   b) Signs should be conspicuously posted in areas where flammable compressed gases are stored, identifying the gases and the appropriate precautions to be taken.
8. Cylinders should have current hydrostatic test date engraved on the cylinder. Cylinders should be returned to the supplier for servicing prior to the expiration date.
9. Do not place cylinders near heat, sparks, or flames or where they might become part of an electrical circuit.
10. Do not store cylinders in exit corridors or hallways.

**Handling and Use**

1. Only Compressed Gas Association fittings and components are permitted for use with gas cylinders.
2. Only use regulators approved for the type of gas in the cylinder. The CGA number on the cylinder valve must match the CGA number on the regulator.
3. Do not use adapters to interchange regulators.
4. Use care when threading a regulator onto a cylinder to avoid damage and a leaking connection.
5. Open cylinder valves slowly and face away from the valve when opening it. Ensure that others are not facing the valve when you open it.
6. Never force a gas cylinder valve. If the valve cannot be opened by the wheel or small wrench provided, the cylinder should be returned.
7. Transferring gases from one cylinder to another, refilling cylinders or mixing gases in a cylinder are all prohibited.
8. All cylinders are to be considered full unless properly identified as empty by the user. Empty cylinders must be returned promptly and not accumulated.
9. Compressed gases must not be used to clean skin or clothing.
10. Never heat cylinders to raise their internal pressure.
11. Do not use copper (>65%) connectors or tubing with acetylene. Acetylene can form explosive compounds with copper, silver and mercury.
12. Always leave at least 30 psi minimum in “empty” cylinders. Do not leave an empty cylinder attached to a pressurized system.
EMERGENCY PROCEDURES FOR ACCIDENTS AND SPILLS

Medical Emergencies and Injuries Requiring Emergency Response
Call 911. Be prepared to identify the location of the emergency and provide details to the emergency operator. For student emergencies, follow the emergency procedure flow chart posted in the lab. This is included as Appendix 8A in this document. A separate flowchart is included in Appendix 8B for dealing with emergencies involving employees (TAs or instructors).

After the emergency has been handled, refer to Appendix 8A or 8B as appropriate and EHSRM’s website (http://www.uaf.edu/safety/) for current reporting procedures.

Spill Clean-up Procedures
1. Spill response information shall be included in your laboratory procedures. It is the instructor’s responsibility to provide spill response procedures and train TAs in them. TAs are responsible for ensuring students know what to do if there is a spill. Instructors, TAs and students are responsible for following procedures. Instructors and TAs can contact the Laboratory Supervisor for assistance and the Laboratory Manager to obtain appropriate spill clean-up materials. Appropriate spill control materials should be obtained and in the lab prior to beginning work.
2. Whether or not a spill would constitute an emergency shall be spelled out in the procedures. It is the instructor’s responsibility to make this determination and provide written guidelines for what would constitute an emergency. TAs and students are responsible for following the documents and responding in accordance with the written guidelines.
3. If you do not feel comfortable cleaning up a hazardous material spill, contact the Laboratory Manager and Laboratory Supervisor immediately. If they are unavailable, you may contact EHSRM for assistance during business hours. After business hours, contact Dispatch.
4. Call 911 if a spill causes an emergency, is likely to become an emergency, or if anyone is in danger from the spill. A telephone is available in the south (front) entry of the building, between the outer and inner doors of the entry.
5. Attend to anyone who may have been contaminated during the spill or who is injured. Ask if others in the room have training that allows them to assist you.
6. Notify or instruct someone to notify occupants in the immediate area of the spill.
7. Evacuate all nonessential personnel from the area. Students who are not assisting the TA or instructor may be directed to go to one of the interaction or lounge areas in the building and wait there if the building is still safe.
8. If the spilled material is flammable, turn off all ignition and heat sources; this includes magnetic stir plates and refrigerator/freezers. If you unplug the refrigerator/freezer, please notify the Laboratory Manager and Laboratory Supervisor immediately so they can make sure the materials in it are taken care of.
9. Ensure that the fume hood is on.
10. Confine or contain the spill to a small area using dikes or spill pads if you can do so without injuring yourself or anyone else.
11. Avoid breathing vapors of the spilled material. If the vapors require a respirator and you do not have one, evacuate the area and call for emergency assistance. B&W personnel are not trained to handle such a spill and shall call for assistance.
12. Wear suitable PPE, including appropriate gloves, lab coat and chemically-resistant goggles for clean-up. Ensure that PPE is resistant to the spilled material.
13. Use appropriate kit and materials to neutralize and absorb inorganic acids and bases.

EXPOSURE MONITORING
Exposure assessments and monitoring shall be conducted by the UAF Industrial Hygienist (474-6771). Any chemical requiring exposure monitoring shall only be used after receiving approval from the Laboratory Supervisor and EHSRM.
**Initial Monitoring:**
Exposure monitoring shall be performed when there is reason to believe that exposures are in excess of the action level or the PEL. Substances which require monitoring under these conditions are listed in OSHA Regulations, 29 CFR 1910 Subpart Z.

**Periodic Monitoring:**
If initial monitoring reveals that exposures are in excess of the action level or PEL, the employer shall immediately comply with the exposure monitoring provisions of the relevant standard.

**Termination of Monitoring:**
Monitoring may be terminated in accordance with the relevant standard.

**Employee Notification:**
Employees will be notified in writing by EHSRM within 15 working days after receiving any monitoring results. Documentation of exposure monitoring shall be kept and maintained as part of each employee’s personnel record.

**MEDICAL CONSULTATIONS AND EXAMINATIONS**

Employees shall be provided an opportunity to receive medical attention, including any related follow-up examinations, at UAF’s expense, under the following circumstances:

1. An individual develops signs or symptoms associated with exposure to hazardous chemicals in the laboratory.
2. Exposure monitoring reveals an exposure level routinely above the action level or PEL for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
3. An accident such as a spill, leak, equipment failure or explosion results in possible over-exposure to hazardous chemicals.

EHSRM is responsible for establishing and maintaining an accurate record of any medical consultations and examinations provided to an employee for issues related to their employment.