
Applied Microbiology
&
Biotechnology Laboratory

*"sustainable is attainable"*

## Standard Operating Procedure

AMBL-002-A

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| **Last Reviewed:** | 1/6/2023 |
| **Last Revised:** | 7/5/2023 |
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| **EH&S Review:** | Ryelan McDonough 7/4/2023 |

# Site Specific Chemical Hygiene Plan for the Environmental Engineering Laboratory

### SOP SUMMARY

This SOP is the site-specific chemical hygiene plan describing the policies, responsibilities and requirements for the conduct of work and the behavior in the environmental engineering laboratory, and the corrective actions taken when there are violations of these policies and requirements.

### ENVIRONMENTAL HEALTH AND SAFETY

**Hazards Assessment:** This procedure does not contain hazards.

**Safety Equipment and Engineering Controls:** This procedure does not require the use of safety equipment or engineering controls.

**Personal Protective Equipment (PPE):** This procedure does not require the use of PPE.

**Analysis-derived Wastes and Disposal:**

| Waste Generated | Hazardous ( Y / N) | Disposal |
|---|---|---|
| This procedure does not generate wastes. | N | None |

## PROCEDURE DESCRIPTION

# 1.0 Introduction and Applicability

One of the primary objectives of the environmental engineering laboratory is to provide a safe laboratory resource that can support instructional and research needs. The overall oversight of safe campus laboratory and field activities that are in compliance with State and Federal regulations is the responsibility of the NAU Environmental Health and Safety (EHS). The implementation of safe practices that maintain regulatory compliance is the responsibility of individual laboratories across campus. The Chemical Hygiene Plan (CHP) developed by EHS establishes the overall policies and procedures for all laboratory and field activities conducted on and off the NAU campus.

The management of safe environmental engineering laboratory-specific and field activities is the responsibility of the Civil Engineering, Construction Management and Environmental Engineering Department, and requires a laboratory-specific Chemical Hygiene Plan (CHP). This SOP document is the Site-Specific Chemical Hygiene Plan for the Environmental Engineering Laboratory, referred to hereafter as the Laboratory Safety Standard. This Laboratory Safety Standard serves as an addendum to the EHS-CHP and describes those polices applicable to all individuals performing and supervising work, or when accompanying visitors either in the environmental engineering laboratories or in the field.

# 2.0 Definitions for Terms and Abbreviations Used

Previously defined terms and abbreviations used may be found in SOPs that precede this SOP and are not repeated here.

a. Accompanying Individual. Any individual who is accompanying and therefore responsible for visitors in the lab or to field.

b. ADA. American Disabilities Act.

c. CHP. Chemical Hygiene Plan.

d. Corrective Action. An action that prescribes a necessary change to a procedure or behavior to prevent further inappropriate, unsafe or incorrect practices in the laboratory. A corrective action generally results from a safety or procedure performance review that results in a finding of unsafe behavior or work conduct.

e. EHS or NAU-EHS. NAU Environmental Health and Safety
Web site: https://in.nau.edu/environmental-health-and-safety
e-mail: nauehs@nau.edu

f. MSDS. Material Safety Data Sheet. The MSDS was used to communicate hazards and safety precautions of chemical products. The MSDS was generated using many different formats, making information difficult to find from one format to another. As of December 1, 2015, the MSDS was to have been completely replaced by the SDS.

g. PHS. Particularly Hazardous Substance. A PHS is a select carcinogen, reproductive toxin, and/or a substance that has a high degree of acute toxicity.

h. SDS. Safety Data Sheet. The SDS replaces the MSDS. The information in the SDS is largely the same as the MSDS, except the SDSs are required to be presented in a consistent user-friendly using a 16-section format.

i. Service animal. The American Disabilities Act only recognizes a dog required because of a disability as being a service animal, but does have a separate provision for a recognizing a miniature horse that has been specially trained to perform certain tasks.

j. Unsafe behavior or work conduct. Unsafe behavior or conduct of work is that which places oneself or others into a potentially hazardous or otherwise unsafe situation. The actual hazardous situation does not need to actually happen, it just needs to be a potential outcome of the unsafe behavior or conduct. Any other individual working in the laboratory at the same time may perceive a situation to be unsafe, however they must verbally inform you of their concern.

## 3.0 Laboratory Standard Local Policies

a. The Environmental Engineering Laboratory is required to develop and maintain a site-specific CHP, referred to herein as the Laboratory Standard, to address the specific safety practices that are associated with laboratory and field activities conducted at this location.

b. The Laboratory Standard is an addendum to the EHS-CHP, and therefore must be developed and maintained through a process that includes review and input by EHS.

c. The general laboratory safety guidelines in the EHS-CHP are applicable to this laboratory, and all users are required to read and understand the EHS-CHP.

d. The local policies in this Laboratory Safety Standard take precedence over any policy or procedure in the EHS-CHP, so long as they are not in direct conflict with the EHS-CHP. A policy that is in conflict with the EHS-CHP is one that presents an opportunity to create a less safe instructional or work environment situation than what would otherwise exist by following the EHS-CHP. A policy that presents a more stringent

safety requirement than what is required by the EHS-CHP is not considered to be in conflict.

e. Conflicts in a policy or procedure must be clarified and resolved with the involvement of EHS, and if necessary, include the revision of this Laboratory Safety Standard.

f. The policies in this Laboratory Safety Standard and all procedural SOPs supporting work conducted in the laboratory take precedence over any contradicting or absence of policy in a course syllabus.

## 3.1 Addendum to EHS-CHP

### 3.1.1 Applicable to all Laboratory Rooms

a. Prior to conducting work in the laboratory or field, all appropriate and applicable Institutional and local safety training must be completed or updated every 12 months.

   1) Chemical Hygiene and Safety training. This is an institutional training offered on-line through EHS using the Bioraft system.

   2) Biological Safety training. This is an institutional training offered on-line through EHS using the Bioraft system.

   3) Field Safety. This training is no longer available through the EHS web site as an on-line institutional training and is currently provided as needed by instructors or principal investigators on a project-by-project basis. Training arranged through the laboratory and conducted by laboratory personnel is available as a fee-based service.

   4) Environmental Engineering Laboratory local safety training. This is training maintained by the laboratory and is conducted by course instructors and laboratory personnel (see SOP AMBL 001A).

b. Prior to any new work in the laboratory or field, a project-specific planning document or an amendment to that original planning document is required to include the identification of hazards and safety protocols that are specific to that work (see SOP 001A).

c. None of the laboratory rooms are considered a space where members of the public are allowed.

d. Outer doors leading to the building hallway are to be closed at all times so that the proper operation of the fume hoods and the security of the laboratory space can be maintained. These doors are not to be unlocked or propped and left unattended.

e. Food and food containers, drink and drink containers, and eating utensils are prohibited in the laboratory. This includes the prohibited use of laboratory sinks for rinsing or washing food and drink containers and

utensils. Additionally, the disposal of food- or drink-related wastes in this laboratory's waste containers is also prohibited because this gives the appearance that food or drink have been consumed in the lab. On occasion, food-related or edible items may be brought into or grown in the lab for the purpose of an experiment. Under no circumstance may these items then be removed from the lab or be used for human consumption.

f. Fume hoods are to be used for conducting procedures or operations that emit chemical aerosols, dust, fumes, or vapors that present an exposure hazard if inhaled or contact is made with the conjunctiva (mucus membrane that lines the eyelid and surface of the eye), or to control unpleasant odors.

    1. Items that are generally allowed in the fume hood are those that are necessary for conducting a procedure requiring the use of a fume hood. Regardless, care must be taken to avoid obstructing the airflow through the hood and ensuring that incompatible materials remain segregated. These items may remain in the hood so long as the procedure requiring the use of the fume hood is routinely being performed.

    2. Items such as reagent and chemical bottles, hazardous waste containers and apparatus are not to be stored in the fume hood. These items not only interrupt the proper air flow through the hood, but left unmanaged may result in incompatible materials being store next to one another.

    3. Open topped, unattended containers are considered an unlawful disposal of hazardous materials by allowing vaporization.

g. Soldering or performing any other activity that produces hazardous vapors or fumes are not allowed to be conducted in open areas of the laboratory. If these activities cannot be conducted in the fume hood or below one of the fume vent nozzles located in Room 241, or if they generate more fumes or vapors than can be adequately exhausted, they must be conducted in a location outside of the laboratory that is adequately and safely ventilated.

h. The floor areas around the eyewash and safety shower stations are not to be used for storing items that block or may otherwise impede the use of the station.

i. The storage of certain chemicals being actively used is allowed. These chemicals are checked out by the user and must be stored only in cabinets identified as "Local Chemical Storage" (See SOP 006C). The door to this cabinet must post an inventory of chemicals being stored and contain the name of the user(s) responsible for those chemicals. Incompatible chemicals cannot be stored together. Flammable and highly oxidative chemicals are not to be stored locally in this way.

j. Chemicals are not allowed to leave the Laboratory, with the exception of those chemicals in amounts required to conduct planned field activities.

k. The personal use of mobile phones, smartphones, tablets, laptops or other portable electronic devices in the laboratory is restricted to areas where contamination of the device is not possible.

   1. Using any of these devices for purposes other than for supporting the laboratory work being performed is prohibited due to the potential for becoming contaminated and for creating an unsafe condition by distracting its user away from the procedure being performed.

   2. A device may be used in the area where laboratory procedures are conducted only for the purpose of supporting the laboratory work being done. Such uses include documenting the experimental setup with images (pictures), providing a timer, entering data where calculation results are needed as part of conducting the procedure, and using instrument-specific software for monitoring instrumentation or collecting data.

   3. Never use these devices with gloves. Remove your gloves before you pick up the device to prevent transferring contaminants from the glove to the device.

   4. Never place a device on a laboratory bench near a location where procedures are conducted to prevent spilling, splashing or otherwise transferring contaminants to the device.

   5. A laptop or other device used to monitor either instrumentation or a procedure, or to collect data during a procedure may be used by providing a chemical-free location. Thoroughly clean and disinfect the location, and provide a chemical-free mat or pad on which to place the device.

l. Dogs that are trained service animals and required for a disability are allowed only in Room 242/245 within the instructional area under the following conditions.

   1. The handler must be in control of the animal at all times, as defined by ADA.

   2. The handler should provide a mat upon which the animal must be positioned, and remain, otherwise the animal must be located in an area known to be free of chemicals, broken glass or other debris.

   3. The animal must be in sight of its handler, to the extent possible, or have the handler work at a lab bench that can accommodate this condition.

   4. Conduct a Service Animal Needs Assessment for each service animal to be allowed in the laboratory and discuss this assessment with the student handler.

m. Emotional support animals are not allowed in the laboratory.

### 3.1.2 Location of Emergency Contact Numbers

A list of emergency and other contact numbers is located on both sides of each laboratory room door leading to the main hallway.

### 3.1.3 Hazard Communication and Location of Safety Data Sheets (SDS)

a. Binders containing the SDS are located just inside the entry to Room 245 and to the left along the north wall. This is the hazard communication station.

b. Individual users working on projects or conducting research in the laboratory, are encouraged to also maintain a project binder that contains a collection of SDS relevant to their work. This binder serves as an alternate way to communicate project-specific hazards to other users in the laboratory.

### 3.1.4 Location of the Chemical Inventory

The inventory of chemicals is not publicly available. Contact the Laboratory Manager or the Laboratory Director to request information about the availability of chemicals that are needed in support of a specific project activity.

### 3.1.5 Location of the Standard Operating Procedures for the AMBL

Standard operating procedures (SOPs) applicable to this laboratory may be found and downloaded from the following location.

https://www.ceias.nau.edu/~teb/ambl/ambl_SOPs.html

### 3.1.4 Location of Personal Protective Equipment

Generally, each laboratory room has a supply of certain PPE. Laboratory coats, protective eyewear and gloves are located just inside the entry door of Rooms 241 and 245. Additional protective equipment is available upon request or based on the needs identified in the hazard assessment on a project-by-project basis.

### 3.1.7 Location of the Eyewash/Safety Showers, First Aid Kit and AED

a. Each laboratory room has an eyewash/safety shower station located next to one of the sinks.

b. A first aid kit is located in Room 245 next to the hazard communication station.

c. Two first aid kits are available for use when conducting field activities. These may be checked-out along with other equipment taken out of the laboratory and used in the field.

d. An automatic external defibrillator (AED) is located in the main hallway next to (north of) the 2004B door.

### 3.1.8 Location of Spill Kit

The spill kit is located on the floor beneath the laboratory bench and below the distilled water system in the Instrumentation Laboratory (Room 241).

### 3.1.9 Location of Fire Extinguisher and Fire Alarm

a. One fire extinguisher is located in Room 239, just inside of the outer door leading to the hallway. Another fire extinguisher is located in the main hallway directly across from the 2004A door. Only use the fire extinguisher if competent or have been trained to do so. Use the extinguisher for only MINOR fires.

b. If you experience an outbreak of fire and the fire cannot be controlled, remain calm. If it is safe to do so, close the fume hood sash and all doors to confine the fire, and then leave the area.

c. Activate the fire alarm, which is located to the right of the south exit door leading to the stairwell on the second floor.

d. Evacuate the building through the south exit door and **Call 911**. Identify the fire location and give any other information that you have about the source of the fire and any other known hazards in the area.

e. If you hear the emergency fire alarm, regardless of the reason, calmly stop work and turn off any equipment that you are using. Evacuate the building through the south exit doors unless the fire is located in that stairwell.

f. Once outside, proceed to the nearest assembly area. In this case, the nearest assembly area is located on the south side of the Health Professions building and directly east of the Engineering building.

g. Do not re-enter the building until you are officially told to do so.

h. A link to the Fire Safety and Evacuation Plan for the Engineering Building may be found on the EHS web site. A link to the Engineering building evacuation plan is available from AMBL's SOP web site (see 3.1.5).

### 3.1.10 Designated Areas for Particularly Hazardous Substances

a. Particularly hazardous substances or substances that are a PHS, are to be handled in the following designated areas to provide an extra layer of security and exposure prevention.
    1. Fume hoods in Room 239 or Room 241. Perform all weighing, stock regent preparations, and use of stock solutions to prepare intermediate and working solutions in these fume hoods.
    2. Chemical Storage Room 241a. Store a solid or a liquid PHS in the chemical storage room when not being used. This room is locked and you will need to coordinate with the Lab Manager to have these substances moved in and out of storage.
b. A sign designating the above fume hoods as an area where a PHS is handled is to be place on the fume head when being used for this purpose.

## 3.2 Responsibilities

a. The Laboratory Director and the Laboratory Manager are jointly responsible for ensuring that all users are aware of their individual responsibilities to behave and work safely while in the laboratory, and for monitoring that the policies in this Laboratory Safety Standard and individual procedures are being followed. This responsibility includes the following.
    1. Providing local safety training to individual users. This training includes ensuring that this Laboratory Safety Standard and all applicable SOPs are made available to individual laboratory users, course instructors, and supervising faculty members.
    2. Ensuring that individual users have access to the appropriate personal protective equipment and that these are in good condition.
    3. Inspecting work areas and conducting safety performance audits and reviews.
    4. Documenting safety performance audits and reviews, and reporting the findings to individual users, supervising faculty members, the department chair or EHS as determined necessary.
    5. Working with the individual user to implement needed corrective actions resulting from the findings of a safety performance audit or review.
    6. Coordinating with and responding to EHS concerning institutional audit findings and corrective actions.

    Neither the Laboratory Manager nor the Laboratory Director can be held responsible for the day-to-day personal supervision of individual users.

b. Individual users of the laboratory are directly responsible for their own safety and must conduct their work and behave in a manner that is safe to all other individuals who are in the laboratory. This also applies to field activities. This responsibility includes the following.

   1. All work must be planned and a hazards assessment must be conducted as part of the planning process so that known hazards are identified and assessed for their prevention.
   2. All procedures must follow a documented procedure and must include the results of the hazard assessment associated with the procedure, before the procedure is conducted.
   3. When working with a PHS that does not have a lab-specific SOP, the laboratory user is required to notify EHS to seek additional guidance regarding the hazards associated with that material.
   4. Undocumented procedures, including new and developing methods, or procedures that are being modified from a previously documented procedure are to be developed as a new SOP. It is recognized that the development of a new SOP may need to be done in parallel with the development of a new or modified procedure and thus cannot always be completed prior to the actual conduct of the procedure.
   5. All safety performance review findings requiring corrective actions must be addressed in coordination with the Laboratory Manager or the Laboratory Director.

c. Supervising faculty members who are instructors of courses regularly scheduled to meet in Room 245 are responsible for the safety and behavior of their students and must personally supervise the students during the regularly scheduled class time unless arrangements have been made for an alternate supervisor to perform this function during an absence from campus. The ultimate responsibility however, remains that of the supervising faculty member who is equally responsible for ensuring that the alternate supervisor is adequately trained and prepared for this function. This responsibility extends to controlling the hazards associated with the laboratory course work, and to ensuring that all students enrolled in the course complete required safety training before they commence work and that thereafter, they conduct their work and behavior in a safe manner. When work is required outside of the regularly schedule class time, the supervising faculty member must coordinate this schedule with the Laboratory Manager or the Laboratory Director. Additionally, should a student in the course commit a violation that results in laboratory access being revoked, the teacher is responsible for determining how (or if) the student may make up course requirements without lab access.

d. Supervising faculty members who are instructors of courses not scheduled to meet in room 245 assume different levels of responsibility, as described below.

    1. A supervising faculty member who is not an authorized user cannot enter the laboratory to personally supervise their students' work, and therefore the Laboratory Manager and Laboratory Director become responsible for monitoring the work as described in section 3.2.a.

    2. A supervising faculty member who is also an authorized user assumes responsibility for the safety and behavior of their students and for periodically supervising their students' work in the laboratory. Although this supervision is typically more focused on the progress of the work, the supervising faculty member must also be aware of potential hazards and report these to the Laboratory Manager or Laboratory Director.

e. All Individual users not associated with a regularly scheduled class are responsible for coordinating their planned work schedule and any changes to that schedule through the Laboratory Manager or the Laboratory Director.

f. All visitors are responsible for expressing their concern about any condition, hazardous or not, that gives them an uncomfortable, insecure or otherwise unsafe feeling while they are in the laboratory or observing field activities. This concern should be expressed to their accompanying individual as soon as possible.

g. Any individual accompanying visitors is responsible for making their visitors aware of any potential hazards they may encounter and for informing their visitors to immediately mention if at any time they become uncomfortable, insecure or otherwise feel unsafe while in the laboratory or observing field activities. The accompanying individual must accommodate the visitor in a manner that does not unduly interrupt the laboratory or field tour, but will remove the visitor's concern. This is most easily done by having the visitor leave the laboratory or remove themselves from the area of concern in the field to a distance at which they are comfortable.

h. All individuals are responsible for reporting actual and potential hazards to the Laboratory Manager or Laboratory Director, and when warranted follow the appropriate emergency procedures.

## 3.3 Instructional and Student Projects Laboratory (Rooms 242/245)

In addition to the policies contained in the EHS-CHP, the following policies also apply to this laboratory area. These policies are intended to help minimize the migration of potential contaminants between laboratory areas.

a. Rooms 242 and 245 are considered a single workspace because a portion of the dividing wall between these rooms was removed to create

the instructional area that spans the entire front of both rooms. The laboratory benches in Room 242 are used for both instructional and student projects. The laboratory Benches in Room 245 are predominantly used for conducting laboratory procedures related to course or workshop instruction.

b. Tables and chairs located in the instructional area are to remain in the instructional area.

c. Backpacks, clothing and other personal items are to remain in the instructional area and kept on either the tables or chairs.

d. Samples, chemicals, glassware, instruments, equipment, PPE or other materials that are normally used in the laboratory and could potentially contaminate the tables or chairs in the instructional area are not to be placed on these tables or chairs. Surfaces of all tables and chairs should be routinely cleaned using a disinfectant wipe.

e. The desk and the lecture area may be used to demonstrate laboratory procedures or to project microscopic observations of samples and thus contamination is assumed to occur on these surfaces. Clean and disinfect these surfaces with a disinfectant wipe as soon as possible after their use is finished and before they are used.

f. Equipment and portable instruments routinely used in courses regularly scheduled in Room 242/245 are stored in marked cabinets within this room. These equipment and instruments are to be cleaned and disinfected with a disinfectant wipe and prepared for storage according to the manufacturer's instructions prior returning them to these storage locations.

g. The glassware cleaning station is located in Room 242 and clearly marked. Do not place any other items other than glassware to be cleaned or in the process of being cleaned in this area.

h. A small workshop space is maintained in Room 242 so that minor repairs or assembly may be performed. Working in this area requires eye protectors that provide side protection from flying objects or fragments. Samples or chemicals that could potentially contaminate this area are prohibited, and equipment, instruments or other materials known to be contaminated and needing to be worked on must be decontaminated prior to being brought into this area.

## 3.4 Instrumentation Laboratory (Room 241)

In addition to the laboratory safety policies contained in the EHS-CHP, the following policies also apply to this laboratory area. These policies are intended to help minimize the migration of potential contaminants between laboratory areas.

a. Room 241 is considered to include Room 241A (Chemical Storage) and Room 240 (Balance Room), which may both be accessed from Room 241.

b. Rooms 241 and 240 are considered to be an area that predominantly supports the instrumentation needs of research projects, but must also support instructional needs. As such, the instruments located in Rooms 240 and 241 are not to be moved from their stations. An instrumentation station includes the instrument and any accessories that are routinely used with that instrument or were provided by the manufacture.

c. Similarly, any accessories associated with a particular instrument station are not to be moved.

d. When working in the vicinity of the analytical balance room, be aware that others may need to enter and exit the balance room while carrying a desiccator, chemical bottles or weighed chemicals. Stand clear from the analytical balance room door so that users may enter and exit without creating a potential chemical spill situation.

e. There will be times when the door to the chemical storage room (Room 241A) is propped open so that chemical supplies may be moved safely through the door. Authorized laboratory users are prohibited from entering Room 241A unless explicit permission from the Laboratory Manager or the Director to do so has been given. If permission to enter Room 241A has been given, it is given for that one time only and is not explicit permission granted to enter the room at any other time in the future.

f. Room 241 and Room 241A have areas designated for satellite waste accumulation and where waste samples are staged for pick-up by EHS. Waste containers in these areas must comply with satellite waste accumulation area requirements specified in the P8-Satellite-Accumulation-SOP found on the EHS website.

## 3.5 Applied Microbiology and Biotech Laboratory (Room 239)

In addition to the laboratory safety policies contained in the EHS-CHP, the following policies also apply to this laboratory area. These policies are intended to help minimize the migration of potential contaminants between laboratory areas.

a. Room 239 is considered to be primarily a research area however it must also support instructional needs. As such, the instruments and apparatus located in Room 239 are not to be moved from their stations, nor are supplies to be removed.

b. The desk area at the front of the room is considered a clean space and should be routinely wiped down with a disinfectant wipe as an ongoing maintenance practice. At no time should samples or chemicals or

potentially contaminated equipment or instrumentation be placed in this area.

c. Books, backpacks and other personal items are to be kept in the clean workspace area.

## 3.6 Environmental Engineering Laboratory Office (Room 238)

a. Room 238 is a small office area that provides an area to conduct most administrative tasks for the laboratory, as well as an area to meet with individual students or individual users.

b. This room is also available for securing any items that are not allowed in the laboratory and that students do not want to leave elsewhere in an unsecured area.

c. Newly received sealed chemical containers or other newly purchased lab supplies may be brought temporarily into this room for inventory logging, but any open chemical containers, samples and potentially contaminated instruments or equipment are prohibited from being in this room.

## 3.7 Compressed Gas Cylinder Storage (Rooms 2004A and 2004B)

a. Room 2004A is a compressed gas cylinder storage room with access from the main hallway. Only non-flammable and inert gasses are stored in this room. Oxidative gasses may also be stored in this room, but flammable gases are prohibited. Room 2004A must be locked at all times.

b. Room 2004B is a compressed gas cylinder storage room with access from the main hallway. Only flammable and inert gasses are stored in this room. Oxygen, chlorine and other oxidative gases are prohibited. Room 2004B must be locked at all times.

## 3.8 Safety in the Field

Conducting work in the field typically will occur at one of two different locations; 1) on campus at the CECMEE Field Station or 2) off campus at any number of routine or otherwise planned locations. The safety standards for both of these locations are given in separate SOPs.

## 3.9 Working after Hours or Alone

a. It is understood that within an academic instructional and research setting that not all work can be conducted during normal working hours (8:00 am to 5:00 pm). Furthermore, there will be times when individuals may need to conduct work when there is no one else in the lab.

b. Working alone in the lab is discouraged but not strictly prohibited. However, this does create an increased level of risk to the health and safety of an individual working alone because of the potential inability to access basic first aid supplies or to contact emergency personnel.

c. The following laboratory tasks are not to be conducted when working alone.

    1. The movement or lifting of heavy equipment or instrumentation that poses a crushing hazard or potential to cause severe back or muscle injury.
    2. Performing procedures that present acute or life-threatening hazards without or outside of proper engineering controls.
    3. Performing procedures that involve handling or transferring large volumes of hazardous materials or wastes.
    4. Using equipment or conducting procedures involving potentially uncontrolled release of gasses, vapors or aerosols under pressure, or at any temperature.

d. At a minimum, the following guidelines should be followed to minimize risks associated with working in the laboratory alone, or during times of limited or intermittent building occupancy (weekends and holidays, and evenings).

    1. Obtain permission from the Laboratory Manager or Laboratory Director and the Supervising Faculty member. This should include a thorough discussion and understanding of all procedures and risks involved.
    2. Establish a work schedule that minimizes the potential for working alone and provide copies of this schedule to the Supervising Faculty member and the Laboratory Manager. Do not work outside the established schedule unless this has been formally discussed and approved.
    3. Always make certain that someone is aware that you are in the lab working alone and establish a procedure for contacting that person when you have completed your scheduled work. Ideally, if another person is in the building, they should also be asked to occasionally check on you.

## 4.0 Violations of Safe Behavior and Work Conduct

In order to maintain safety in the laboratory and field, policies and procedures required for minimizing unsafe or hazardous situations must be followed. Failure to follow these policies and procedures is considered a violation subject to immediate corrective actions that typically will include the stop of work until retraining is completed or may include the removal of

the user from the laboratory and revoking laboratory access. Violations that are most common include the following.

a. Any behavior or conduct of work that does not follow the policies contained in the EHS-CHP or in this Laboratory Safety Standard, as well as procedure-specific policies regarding the handling of chemicals and laboratory wastes.

b. Improper use of PPE or conducting a procedure outside the fume hood when it is specifically required to be performed in the hood.

c. Conducting a fume hood procedure when the fume hood is inoperative.

d. Behavior or conduct of work that is perceived by others to present a potential unsafe or hazardous situation.

e. Leaving procedures that involve flames, boiling or heating unattended.

f. Attempting to perform undocumented procedures or procedures that you have not adequately demonstrated your ability to perform safely.

A teacher must report violations to the Laboratory Manager or Laboratory Director. Failure to do so is, in itself, a violation.

It should be remembered that accidental spills or other incidents may occur. These are not necessarily a violation unless it is determined following investigation that procedures were not being followed.

All incidents, whether an obvious violation or not, should be reported so that they may be investigated and documented. When procedural improvements are identified, procedures must be updated. When actual violations are identified, corrective action is required to at least inform the user what should be done differently and what the consequences are if they continue in an unsafe manner.

## 5.0 Corrective Actions

The overall goal of the laboratory is to minimize, if not eliminate, incidents that could lead to exposure, injury, or damage of property. In that regard, corrective actions are necessary to minimize reoccurring incidences or violations by the same individual and to augment the safety training program. A critical component of the safety program is the prompt reporting and assessment of incidences once they occur so that the corrective action can be determined and documented. The policies and procedure for reporting such incidents are given in SOP AMBL 002G Reporting Incidents in the Environmental Engineering Laboratory.

a. An initial violation, unless severe enough to have caused significant chemical exposure, injury or death, will require retraining as a corrective action.

b. A violation that involves significant chemical exposure or injury will require a work stoppage and immediate first aid, and medical or

emergency assistance. If at a later date the affected individual is able to continue work, retraining must first be completed.

c. Any duplication of a violation (the same violation committed a second time) will be subject to work stoppage, retraining and possibly having laboratory access revoked.

d. A third violation of any previous violation will result in revoked laboratory access.

e. Committing three unrelated violations within three months is considered a pattern that demonstrates disregard for laboratory safety and will be subject to work stoppage, retraining and possibly having laboratory access revoked.

f. A violation involving exposure to a chemical that bio-accumulates will result in the user not being allowed to perform any additional work with that chemical.

g. Any single violation that is committed with a disregard to the safety of self or others will result in an immediate request to exit the laboratory and laboratory access will be revoked.

h. Any behavior in the laboratory that becomes disruptive or threatening will result in that user being asked to leave the laboratory or being removed by NAU PD. In either case, laboratory access will be revoked.