

Laboratory Safety

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Broken Glassware Disposal

Broken Glassware Disposal

Glassware must not be disposed of with normal trash. Building Services Personnel and others have been

injured when carrying trash bags with broken glassware in them.

- Several cuts or lacerations due to the improper disposal of laboratory glassware have been reported on the campus. In an effort to eliminate or minimize these injuries, certain procedures will be followed when discarding broken or unserviceable glassware.
- Broken glassware should immediately be cleaned up. A laboratory should already have a small brush and dust pan available to clean up after small accidents. Forceps or duct tape can be used to pick up the smaller pieces of broken glass.
- Discarded glassware must not contain any hazardous wastes, Medical Waste, Pathological Waste or Radiological Wastes.
- If the glassware contains hazardous wastes or Radiological Wastes, please call complete the Hazardous Waste Disposal form.
- If the glassware contains or is contaminated with any pathological or biological materials, call ext. 2862 for disposal instructions.

What you need to know:

- Discarded glassware must be placed in a small puncture proof, double-lined cardboard box or a container specifically designed for the disposal of glassware
- The box must be securely sealed with tape.
- Any cardboard box may be used, provided it is sturdy and of a size that will not weigh more than 40 pounds when full.
- The container must be labeled as to the contents.

o CAUTION LABORATORY GLASSWARE ONLY!

o NO HAZARDOUS WASTE, MEDICAL WASTE, PATHOLOGICAL WASTE OR RADIOLOGICAL WASTES

o Complete [Broken Glassware Disposal Form](#)

- Never allow Custodial Services to handle broken glassware.
- Never use laboratory glassware boxes for the disposal of

o Sharps

o Biohazardous materials

o Liquid wastes

o Chemically contaminated laboratory glassware/plastics or plastic-ware

o Chemical containers that can't be disposed of as regular solid waste

Glassware must not be disposed of with normal trash. Building Services Personnel and others have been

injured when carrying trash bags with broken glassware in them.

Laboratory glass that is disposed of in cardboard boxes must be appropriately decontaminated, where

necessary, prior to disposal. If you have any questions about this disposal procedure, please contact

Environmental, Health and Safety for additional information or instructions.

Empty Containers

Empty containers of five (5) gallons or less may be placed in dumpsters if they meet the definition of the

Resource Conservation Recovery Act (RCRA) empty container rule.

Any container that previously held a hazardous chemical or waste is defined as empty if:

- No hazardous materials can be poured, pumped or drained from the container, AND,
- No hazardous materials remain in the container that can be feasibly removed, AND,
- the walls of the container must not contain any significant residual materials, AND,
- The label is removed or defaced, AND,
- The lid is removed, AND,
- The container is placed directly into a dumpster.

Triple-rinsing is not required to comply with the RCRA empty container definition

Chemical Hygiene Plan

ARKANSAS STATE UNIVERSITY

CHEMICAL HYGIENE PLAN

Purpose and Scope: The purpose of the program outlined in this plan is to set forth procedures, engineering controls, personal protective equipment (PPE) and work practices that are capable of protecting all employees from recognized hazards posed by hazardous chemicals used within the facility. This plan covers all faculty, staff and students (collectively referred to as employees) that work within the facility.

General Principles: Minimize all chemical exposures. Avoid underestimation of risk posed by hazardous chemicals. Provide adequate ventilation using engineering controls. Observe Permitted Exposure Limits (PELs) and Threshold Limit Values (TLVs) where these are prescribed. Comply with appropriate Chemical Hazard Protocol(s).

Chemical Hygiene Responsibilities:

□ EHS Director : Develop and implement appropriate chemical hygiene policies and practices. Promulgate current legal requirements concerning regulated substances. Determine the required levels of protective apparel and equipment. Review/ update the Chemical Hygiene Plan annually. Respond to researcher queries regarding new procedures/ chemicals. Monitor new procedures and determine appropriate employee protection. Ensure employee exposures do not exceed PELs. Monitor exposure if there is suspicion of levels of exposure in excess of action level or PEL (available on the MSDS for the substance) for a given substance. Notify employee of monitoring results within 5 working days or receipt. Establish and maintain for each employee an accurate record of any measurements taken to monitor exposure or of any medical consultation or examination given as a result of exposure. Ensure that the records are available to that employee. If initial monitoring indicates levels in excess of OSHA PEL, then work with that substance must stop until such time that measures are taken (through engineering controls or work practices) to reduce employee exposure level below the PEL for that substance. Additional monitoring must be done after the new measures to show that employee exposure level is then below the PEL before work with substance can resume.. Provide chemical hygiene training to all new employees and students per 40CFR1910.1450(f)(2).

□ Facility Manager: Monitor procurement, use and disposal of chemicals used in the lab. Ensure that

facilities and training for any material being ordered are adequate. Perform regular, formal chemical

hygiene and housekeeping inspections including routine inspections of emergency equipment.

□ Faculty/Supervisors: Ensure that the staff and students know and follow the chemical hygiene rules and

project-specific protocols, that PPE is available and in working order, that staff and students know the

location of the chemical hygiene plan and where to find a SDS for the substances with which they may

come into contact, and that appropriate training has been provided. Keep a copy of all SDSs that are

shipped with the substance from the supplier. Provide an inventory of all hazardous chemicals to EHS

annually before June 15. Check chemical fume hood for proper operation monthly; request annual hood

certification by Arkansas State University EHS

□ Staff/Students: Plan and conduct each operation in accordance with the chemical hygiene program and

project-specific protocols. Develop and maintain good personal chemical hygiene habits. Review the

SDS of a chemical before working with it. Never remove or deface the label on a container containing a

hazardous substance.

The Laboratory Facility: Each laboratory should be equipped with a fire extinguisher, chemical fume hood,

emergency eyewash and drench shower where appropriate as determined by the EHS Director. All work

conducted and the scale of the work must be appropriate to the physical facilities available. A minimum of 6

room air changes per hour is required. The EHS Director, or his designee, shall certify chemical fume hoods

annually to ensure a minimum face velocity of 100 lfpm. Hoods shall be used as work areas, not storage areas.

Storage of chemicals should reflect compatibility and common sense. Access to exits, emergency equipment

and utility controls shall never be blocked.

Chemical Hygiene Rules:

□ Avoid "routine" exposure. Do not smell or taste chemicals. Use a hood if the TLV (available on the

SDS) of a substance is <50 ppm.

□ Do not apply cosmetics, eat, drink, smoke or chew in laboratories. Do not store or handle food or beverages in laboratories.

□ Use appropriate PPE. At a minimum, all persons, including visitors, when in a laboratory in which chemicals are in use or a chemical process is in progress, shall wear eye or face protection.

□ Avoid inappropriate apparel (loose clothing, sandals, etc.) horseplay and pipeting by mouth.

□ Do not work alone in the building; do not work alone in the laboratory if the procedures being conducted

are hazardous. Post an appropriate sign on the door and leave the lights on whenever an ongoing operation is left unattended.

☐ Deposit hazardous waste in and appropriately labeled, closed container; waste characterization, label and container are provided by the EHS Director or his designee. Do not discharge hazardous waste to the sewer.

☐ In the event of a spill, the priority of actions shall be: personnel decontamination, spill containment, cleanup.

☐ Keep laboratories clean and uncluttered. Label all containers containing chemicals.

☐ If a substance is produced in the lab for use outside of the lab by another user, then the facility manager must comply with the Hazard Communication standard (29CFR1910.1200) for that substance.

☐ Particularly Hazardous Substances (carcinogens, reproductive toxins and acute toxins) shall be handled per specific protocols approved by the EHS Director.

☐ All manipulation of free nanoparticles MUST be performed in a HEPA-filtered bag in/out chemical fume hood, exhausted glove box, biological safety cabinet or an exhausted enclosure specifically designed for handling nanoparticles. Contamination of the exhaust system must be avoided in order to protect maintenance personnel; a bag in/out HEPA filter MUST be in place between the work enclosure and the building's ductwork.

Training: All employees shall be trained to the standards required by 29CFR1910.1450(f)(4), which includes:

☐ Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.). The physical and health hazards of chemicals in the work area. The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

Chemical Right to Know Poster

[Chemical Right to Know Poster](#)

Chemical Spill Response Guide

Laboratory Spill Response Guidelines

All laboratories should have a written emergency plan, a spill kit to contain and/or clean, documented

training in spill response and a broken glass receptacle. At a minimum a chemical spill kit should contain:

- A 5 gallon bucket with a closeable lid
- Absorbent (vermiculite, cat litter or other multi-purpose absorbent)
- Scoop
- Small broom
- Required PPE (if not already available in the lab)

A few additional items that may be useful in a spill kit but are not required are:

- pH paper
- Sponge
- Small plastic zipper bags
- Sodium bicarbonate (for acid spills)
- Citric acid or boric acid (for base spills)

Additional information can be found in the A-State Laboratory Safety Manual, Biological Safety Manual

and the Radiation Safety Manual.

When in doubt or if you have any questions, do not hesitate to reach out the department of environmental, health and safety at 870-972-2862 or 870-972-3644.

Biological

Biological spills outside biological safety cabinets will generate aerosols that can be dispersed in the air throughout the laboratory. Wait 30 minutes prior to initiating spill clean up to allow aerosols to settle or be removed by the ventilation system.

BSL 1 Level Spill

- Wear disposable gloves.
- Soak paper towels in disinfectant and place over spill area.
- Place towels in plastic bag for disposal.
- Clean spill area with fresh towels soaked in disinfectant.

BSL 2 Level Spill

- Alert people in immediate area of spill.
- Put on protective equipment.
- Cover spill with paper towels or other absorbent materials.
- Carefully pour a freshly prepared 1 in 10 dilution of household bleach around the edges of the spill and then into the spill. Avoid splashing.
- Allow a 20-minute contact period.
- Use paper towels to wipe up the spill, working from the edges into the center.
- Clean spill area with fresh towels soaked in disinfectant.
- Place towels in a plastic bag and decontaminate in an autoclave.

Chemical

In the event of a chemical spill, the first priority shall be personnel decontamination. Any

personnel that have been exposed to hazardous chemicals on the skin or in the eyes should use the emergency eyewash or safety shower as soon as possible. If no one has been exposed or all exposed personnel have been adequately treated, the next priority shall be containment of the spill to keep it from leaving the immediate area. Once the spill is contained, the last step is clean up. Whether or not lab workers can clean up a hazardous chemical spill will depend on the type of chemical that has been spilled and the quantity. No lab worker should attempt to clean up a spill that they do not feel comfortable cleaning. Below are some basic criteria for determining whether or not you can clean up a chemical spill.

Spills that can be cleaned up by lab personnel

OSHA defines these types of spills as incidental spills. Lab personnel may clean up a hazardous chemical

spill if:

- The quantity of spilled chemical is small (less than one liter).
- The chemical is known.
- The chemical is not a highly hazardous chemical or a chemical that may require respiratory protection.
- The personal protective equipment required to clean up the spill safely is available.
- The materials to clean up the spill are available.
- The hazards presented by the chemical are well understood.

If all of these criteria are met, then lab personnel may first contain the spill and then clean up the spill.

Spill cleanup materials shall be placed in a container and labeled as chemical waste. Fill out the waste

request form available on the EHS website to have the materials removed from the lab

Spills that require EHS assistance

Some spills may not require a HAZMAT team response but may be outside the scope of cleanup by lab

personnel. A hazardous chemical spill that may require EHS assistance includes:

- A spill that is greater than 1 liter but less than 5 gallons (20 L).
- A small spill of a highly hazardous material inside a chemical fume hood.

In these cases, lab personnel must make sure the spill is contained and keep others out of the area until

the spill is cleaned up by EHS personnel.

Spills that require HAZMAT response

Some spills are too large or too dangerous for lab personnel or EHS to handle. Outside assistance is required in these cases. A hazardous chemical spill that may require a HAZMAT team response includes:

- A spill larger than 5 gallons (20 L.)
- A spill that cannot be contained to the site (may leave the university).
- A spill of a highly hazardous chemical outside of a chemical fume hood or other containment device.

The procedure for responding to this type of spill is given below.

1) Evacuate the immediate area.

2) If a person or people became contaminated during the spill, take them to the nearest safety shower that is outside the immediate area where the spill occurred. The person or people should remove contaminated clothing and remain under the shower for 15 minutes if the area is safe to do so. While one person should remain with each person that is placed under the

shower, all others should evacuate the building.

3) Pull the fire alarm to indicate evacuation of the building.

4) Do not shut down the HVAC system. The areas most likely to have a spill are those where the HVAC system will be pulling contaminant away from the office areas. A shutdown of the HVAC system will upset that balance.

5) Notify the local authorities (including the fire department) that this is a chemical spill, not a fire so that the local hazmat team can be dispatched.

6) Notify the EHS director after the local authorities have been contacted.

7) If the constituents of the spill are known, provide the SDS for each constituent to the hazmat team.

8) Once the local authorities give the all clear to return to the building, EHS shall do a quick building check to make sure critical operations are again online before allowing all others to reenter.

Spills of unknown material

All of the above scenarios assume that the material spilled is known. The procedure for spills of unknown materials is given below.

1) Evacuate the immediate area and close the door to the area.

2) Post a sign that indicates the area must not be entered until the spill is cleaned.

3) Attempt to determine the materials in the spill by asking others that work in the area.

4) If that exact nature of the spill cannot be determined, consult EHS.

5) Try to determine if the spill could be a material that is unsafe to clean up. In other words, if there is no possible way it is a highly hazardous material then EHS should be able to safely clean up the spill.

6) If there is the possibility that the spill is a highly hazardous material and the nature of the spill cannot be determined, it will be necessary to contact the local authorities. If this happens to be the case, follow steps 3-8 of the procedure for a large chemical spill.

Radiation Spill

Spreading of radiation beyond the spill area can easily occur by the movement of personnel involved in the spill or cleanup effort. Prevent spread by confining movement of personnel until they have been monitored and found free of contamination. A minor radiation spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. All other radiation spills are considered major.

Minor Radiation Spill

- Alert people in immediate area of spill.
- Notify Radiation Safety Officer (870-972-3644 or 911).
- Wear protective equipment, including safety goggles, disposable gloves, shoe covers, and long-sleeve lab coat.
- Place absorbent paper towels over liquid spill. Place towels dampened with water over spills of solid materials.
- Using forceps, place towels in plastic bag. Dispose in radiation waste container.
- Monitor area, hands, and shoes for contamination with an appropriate survey meter or method. Repeat cleanup until contamination is no longer detected.

Major Radiation Spill

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
- Have potentially contaminated personnel stay in one area until they have been monitored and shown to be free of contamination.

- Call Radiation Spill Emergency Response number (870-972-3644 or 911).
- Close doors and prevent entrance into affected area.
- Have person knowledgeable of incident and laboratory assist emergency personnel

Chemical Storage Guide

Chemical Storage Guide

Stanford University Compatible Storage Group Classification System

Should be used in conjunction with specific storage conditions taken from the manufacturer's label and MSDS.

STORAGE GROUPS

Store chemicals in separate secondary containment and cabinets

- A** Compatible Organic Bases
- B** Compatible Pyrophoric & Water Reactive Materials
- C** Compatible Inorganic Bases
- D** Compatible Organic Acids
- E** Compatible Oxidizers including Peroxides
- F** Compatible Inorganic Acids not including Oxidizers or Combustible
- G** Not Intrinsically Reactive or Flammable or Combustible
- J*** Poison Compressed Gases
- K*** Compatible Explosive or other highly Unstable Material
- L** Non-Reactive Flammable and Combustible, including solvents
- X*** Incompatible with ALL other storage groups

***Storage Groups J, K and X: Consult EHS Department For specific storage - consult manufacturer's MSDS**

If space does not allow Storage Groups to be kept in separate cabinets the following scheme can be used with extra care taken to provide stable, uncrowded, and carefully monitored conditions.



Storage Group X must be segregated from all other chemicals.



Storage Group B is not compatible with any other storage group.

Last updated 04/17/09

Laboratory Hazard Assessment

[illegible]

Emergency Eyewash and Safety Shower Program

Scope

This program outlines the eye/face wash and shower equipment requirements for the rinsing of employees exposed to injurious materials. Each department shall provide eye/face wash and safety shower equipment within the work area where employees and/or students may be exposed to injurious

corrosive materials or other dangerous chemicals. Emergency eyewash, eye/face wash and safety shower units are not a substitute for proper primary protective devices. Personal Protective Equipment

(eye and face protection and protective clothing) should be worn to protect the user from flying particles and splashing liquids.

Responsibilities

Environmental, Health and Safety is responsible for:

- Preparing, reviewing and periodically revising this program.
- Monitoring compliance with this program.
- Provide consultation on placement of emergency showers and eye wash stations.
- Testing emergency eyewash and safety shower equipment quarterly and annually.

Deans, Directors and Department Heads are responsible for:

- Providing emergency safety shower and eyewash or eye/face wash equipment within the work area where employees and/or students may be exposed to injurious corrosive materials or other dangerous chemicals.
- Ensuring departmental compliance with all the procedures outlined in this program.

Facilities Management is responsible for:

- Repair, install or decommission emergency eyewash and safety shower equipment.

Supervisors of Departments/Labs, PI's and Instructors are responsible for:

- Weekly and monthly flushing of emergency eyewash and safety shower equipment.

Equipment Performance

- Emergency shower heads must be located between 82 inches and 96 inches from the surface on which the user stands.
- Emergency shower heads must be capable of delivering at least 20 gallons of water per minute, at a velocity that will not be injurious to the user.
- Control valves must be of the Stay-Open type.
- Emergency showers must be equipped with tepid water, 60°F-100°F. UNM cold water comes from the tap at greater than 60°F in most circumstances, therefore it does not required tempering.
- Emergency showers should be equipped with a drain to prevent building damage. Drains should be plugged in order to prevent accidental discharge of chemicals to the sanitary sewer system. The plug should be flush-mounted to prevent a tripping hazard. Plugs may be removed in the event the shower is used and it was not accompanied by a large chemical spill (highly toxic chemical that endangers public areas or is adjacent to a drain).

Eyewash Units (Including Eye/Face Wash Units)

- Eyewash units shall be installed with the nozzles between 33 inches and 45 inches from the floor and at least 6 inches from the wall or nearest obstruction.
- Eyewash units must provide a controlled flow of flushing fluid to both eyes simultaneously at a velocity that will not be injurious to the user.
- There must be no sharp projections anywhere in the operating area of the unit.
- Discharge nozzles must be protected from airborne contaminants. Whatever means is used to provide this protection must not require a separate motion, by the user, to remove it when activating the unit.
- Eyewash units must be capable of delivering 0.4 gallons of flushing fluid per minute for 15 minutes.
- Eye/face wash units must be capable of delivering 3.0 gallons of flushing fluid per minute for 15 minutes.
- Eyewash units must be designed with enough room to allow the eyelids to be held open with the hands while the eyes are in the stream of flushing fluid.
- Control valves must be of the Stay-Open type.

Hand Held Drench Hose

- Hand-held drench hoses must be capable of delivering 3.0 gallons of flushing fluid per minute for 15 minutes.
- Hand-held drench hoses must provide a controlled flow of flushing fluid to both eyes simultaneously at a velocity that will not be injurious to the user.
- Discharge nozzles must be protected from airborne contaminants. Whatever means is used to provide this protection must not require a separate motion, by the user, to remove it when activating the unit.
- Control valves must be of the Stay-Open type.
- Hand-held drench hoses should not be used as a substitute for an eyewash unit unless it meets the performance indicators listed in the above section and it is not feasible to install an eyewash unit.

Installation

Emergency showers must be located such that they are accessible, require no more than ten (10) seconds to reach, and are within 55 feet of the potential hazard. This functionally means each lab should

be equipped with a safety shower. In spaces where the laboratory showers are not located within the

lab, there must be an unobstructed and clear path that the user can follow without the use of vision.

Eyewash units (including eye/face wash and hand-held drench hoses) must be located such that they are

accessible, require no more than ten (10) seconds to reach, and are within 55 feet of the potential hazard (10 feet where strong corrosives are the hazard). NOTE: Remember the injured worker may have

to locate the unit while blinded by a contaminant. Emergency eyewash and showers must be kept accessible. Items (furniture, equipment, materials) shall not be stored or placed in such a manner that

would block access to them.

Testing Procedures

Testing on the equipment should follow the following schedule:

Emergency showers are tested at least monthly in accordance with the following:

- Verify adequate flow from the unit.
- Verify that the control valve is of the stay-open type and is operating properly.
- Operate for a period of time (2-3 minutes) sufficient to flush any stale water from the supply lines.
- If equipped, remove the floor plug to make sure it is functioning properly; replace plug after test.
- Record the inspection on the attached tag.

Eyewash units are tested at least monthly in accordance with the following:

- Verify flow from the unit.
- Verify that the control valve is of the stay-open type and is operating properly.
- Verify that the flushing streams rise to equal heights and that the fluid will wash both eyes simultaneously.
- Operate for a period of time (2-3 minutes) sufficient to flush any stale fluid from the supply lines.
- Record the inspection on the attached tag.

Hand-held drench hose units are tested at least monthly in accordance with the following:

- Verify flow from the unit.
- Verify that the control valve is of the stay-open type and is operating properly.
- Verify that the flushing streams rise to equal heights and will wash both eyes simultaneously.
- Operate for a period of time sufficient to flush any stale fluid from the supply lines.
- Verify that the hose is free to extend from the mounting bracket and is easy to maneuver.
- Record the inspection on the attached tag.

Weekly Flushing

Operate safety showers, eyewash and eye/face units weekly for a period of 2-3 minutes to flush any

stale fluid and bacteria/viruses from the supply lines.

Shower and Eye/Face Wash Use

Immediate and proper use of emergency eye/face wash and safety showers is essential to minimizing

injury. The following procedures should aid in minimizing injury due to contact with harmful materials:

- Go immediately! Do not waste a moment. Time is of the essence.
- For safety shower:
 - o Pull the handle to activate the shower.
 - o Immediately remove contaminated clothing. Do this while under the shower when gross contamination has occurred. Have someone assist with clothing removal when possible.
 - o If equipped, have the assistant remove the drain plug to allow water to drain.
 - o Flush exposed area for at least 15 minutes.
 - o Seek medical attention after flushing the exposed area.
 - o Notify your supervisor as soon as possible.
- For eye/face wash station:
 - o Activate the hands-free lever. If eyewash is of the hand-held type, have someone hold it for you, if possible.
 - o Get your eyes directly into the stream of water.
 - o If you have contacts, gently remove them while flushing.
 - o Hold your eyes open with your fingers.

- o Gently roll your eyes to ensure complete flushing.
- o Flush for at least 15 minutes.
- o Seek medical attention after flushing.
- o Notify your supervisor as soon as possible.

Training

Supervisors shall train all persons that might be exposed to potentially injurious materials on the location and proper operation of eyewash, eye/face wash and safety shower units. Contact Environmental Health & Safety (870) 972-3644 for course materials or other assistance with this training

Field Research Safety Guidelines

Scope

The field research safety guidelines provided in the attached document are intended to provide assistance to principal investigators (PI), research supervisors, postdoctoral associates, technicians, other employees, graduate students, and undergraduate students with the primary motivation of promoting safety and minimizing risks associated with the execution of research activities in a field setting, where there is an elevated risk of harm compared to routine activities.

General Principal Investigator Responsibilities

University-sponsored research is performed by and/or under the supervision of a principal investigator

or research supervisor, who is responsible not only for the intellectual/academic execution of the research, but also for promoting the safety of all individuals involved in the research effort. When research conducted by student/employees occurs in the field (off-campus), special care and precautions may be warranted.

Principal investigators/research supervisors should draft a generalized field safety policy for their individual labs that can encompass a number of smaller, more project-specific field safety plans (an example of a field safety plan is provided in Appendix B). Principal Investigators are the best authorities

on risks potentially encountered while conducting research at their field sites and should draw upon their

judgment and personal experiences in drafting these plans. Generalized field safety policies should address the following categories, where applicable:

1. Personnel Safety Training - Provide guidelines on the availability and necessity of first aid and/or CPR

training, first aid kits, and other field safety gear necessary for specific field situations.

2. Communications - Provide phone numbers or contact information for PI's or other important lab and

field personnel. Other emergency contact information should also be provided, depending upon the field circumstances.

3. Hazards - Discuss specific chemical, physical, and/or environmental hazards that are important for

your research group to know about. Discuss forms of transportation to be used, decide if special training

is required, and address safety concerns (e.g. ATVs, boats)?

See below for more details on each of these issues and an example of a field research plan, which includes safety and communication components.

Safety Training and Personnel Considerations

Safety Training: An annual training event for First Aid and/or CPR certification needs to be scheduled for

those principal investigators, postdoctoral associates, technicians, graduate, and/or undergraduate students who wish to be certified. Find out more about upcoming classes and reserve your spot for a class by contacting the director of Red Wolf Wellness.

Personnel Staffing: Normal procedure is for at least two persons to work together in the field. In certain

circumstances, the situation may arise that only one person can go into the field. While Arkansas State

University discourages lone workers in field situations, should the situation present itself, approval from

the principal investigator/research supervisor should be established, as well as consent from the lone

field worker. Both parties must understand the risks, and a proper protocol for communication should

be established prior to undertaking the field work.

If a student/employee encounters dangerous working conditions (flooding river, inclement weather, unsafe boats, unsafe sampling location, etc.), the student/employee may discuss the dangers with the

principal investigator/research supervisor, and if not satisfied that the work can be performed safely,

may cease work without repercussions, until the student/employee considers the conditions to be safe.

Ultimately, it is the responsibility of the principal investigator/research supervisor to foster the safety

and wellbeing of students/employees. At the same time, students/employees need to be forthcoming

about their preparedness. Additionally, a field research safety plan should be implemented and all parties aware of the procedures/protocols.

Communications

Any group that includes students/employees conducting field research needs to adopt a communications protocol ensuring that adequate communications equipment accompanies students/employees in field settings.

The written field research plan should include a 'Communications' section that outlines a communication protocol that the principal investigator/research supervisor implements and that the

field researchers follow. At a minimum, this protocol should include emergency contact numbers, an

emergency communication protocol, and communications equipment requirements (e.g., cell phones, satellite phones).

Cellular phones should be carried by each field team while conducting field work for use in case of emergency

The principal investigator/research supervisor should make clear the communications equipment expectations for all students/employees conducting field work. In most cases, a student's/employee's

cell phone will suffice for communications equipment. The field research plan communication protocol

should detail circumstances when personal cell phones are inadequate, such as when research is conducted outside of cell phone coverage, or if research is conducted abroad and U.S. cell phones may not work with basic U.S. cell phone plans. In these circumstances, the principal investigator/research supervisor should either provide alternate communications equipment (cell phone with international access or satellite phone, for instance) or develop a field research plan (see below) that includes planned communications between the field researcher and the PI or other designated party.

Communications Plan Component of Field Research Plan

At the principal investigator's/research supervisor's discretion, field communications plans may be included in the field research plan to facilitate communication between field researchers and the PI or other parties such that persons not accompanying the student(s)/employee(s) know when and where the students/employees are conducting field research. If the students/employees have not safely returned by some predetermined time, emergency services will be contacted on their behalf. The purpose of a field research plan is to avoid a circumstance where a student/employee field crew is conducting field work without the knowledge of some person not on the field research crew. The field research plan is also designed to keep in contact with a field team if they are conducting field work for an extended period of time. If the field team were to encounter an emergency and be unable to contact emergency services for whatever reason, the emergency contact would attempt to contact the field crew at a designated time. If contact is not established, emergency services would then be contacted.

When appropriate, field communications plans should be filed with the emergency contact before the field crew departs. Field communications plans should contain sufficient detail about the location of the field research such that the emergency contact can, if required, direct emergency services to the research site. The field communications plan should also detail a date and time at which, if communication between the field crew and the emergency contact cannot be established, the emergency contact will implement emergency measures. The PI/designee must verify that each member of the research team is in possession of and understands the field communications plan. An example of a field communications plan can be found in Appendix A.

Potential Fieldwork Hazards and Special Circumstances

This list is by no means exhaustive. Each field site has its own set of unique conditions and potential hazards that should be discussed with the research advisor and team. Each principal investigator should develop field safety guidelines for the students/employees involved in fieldwork and discuss

specific

strategies for avoiding or mitigating field hazards.

All-Terrain Vehicles: All users should be properly trained in the safe use and operation of vehicles that

may be used in the field. Operators must be over the age of 18 years old and must sign and submit Appendix E, Release of All Claims for Personal Injury and Property, Student and Arkansas State Employees Operating Boats or All-Terrain Vehicles prior to travel.

Animals/Wildlife: Particularly when working in remote areas, animals/wildlife may be of particular concern. Each field location will have its own unique fauna and the potential threat posed by these animals should be considered. Particular attention should be paid if working in an area during mating

season or when offspring are present, as these situations may make certain animals more likely to be

aggressive. If the fieldwork involves intentional animal handling, hazards such as bites, infection, etc.

should be addressed.

Biological Hazards: Contamination of air, water and food sources by local bacteria and viruses should be

considered. Immunization may be considered for things like tetanus or other diseases if engaged in activities that put researchers at greater risk. Routine prevention measures should be taken, such as

dressing to avoid tick exposure, mosquitos, etc. Consider the potential for water-borne diseases, and

have access to clean water, or take appropriate steps to use personal water purification devices while

working/camping. Be aware of insect borne diseases such as Zika, etc. and review protective strategies.

Boating Safety: All users should be properly trained in the safe use and operation of boats. Personal flotation devices must be available for all passengers and must be worn at all times when in a boat.

Safety should be considered not only while on the open water, but also during docking procedures, as

this is often when accidents and injuries can occur. Operator must be over the age of 18 years old, Complete a Boating Education Course, carry proof while operating the boat and must sign and submit

Appendix E, Release of All Claims for Personal Injury and Property, Student and Arkansas State Employees Operating Boats or All-Terrain Vehicles, prior to travel.

Cellular Access: When working in a rural area, be aware that cell phone coverage may be limited, and

not available for emergency assistance. Also, consider that not all rural areas have 911 emergency phone numbers in place. If this is the case, know the direct phone number for local emergency services

such as ambulance, fire and police and update field communications plan accordingly.

Chemical Safety: If working with hazardous chemicals while in the field, all precautions should be taken

that would normally be taken in the Arkansas State University research lab. Proper personal protection

should be worn (gloves, goggles, face shield, etc.) and proper ventilation should be available.

Additional

safety precautions may need to be considered if transporting chemicals to a field site. Also consider

what waste disposal procedures may need to be in place. Contact EHS with any questions.

Electrical Hazards: Consider any electrical hazards that may be present at a field site, including high

voltage power lines, etc. Research equipment/instrumentation should be checked for signs of wear prior

to deployment in the field (frayed lines, stripped wires, etc.). Care should be taken when operating electrical equipment near water sources.

Environmental Hazards: Natural environment and weather conditions may pose a hazard to personal

safety. Each field site will have its own unique set of conditions that may need to be considered.

The

principal investigator should discuss potential hazards with personnel prior to field deployment.

Issues

of concern may include the potential for hyperthermia, hypothermia, sunburn, dehydration, high altitude (altitude sickness), frostbite, flash flooding, rock and mud slides, etc. Proper personal gear should be available appropriate to the field site and its weather/environmental conditions.

Equipment Hazards: Equipment used in the field such as chainsaws, pumps, motors, etc. may pose a

safety hazard if not operated properly. All users should be trained in the safe operation of any equipment to be used in the field.

First Aid: First aid kits should be available at all field sites and should be routinely checked for adequate

supplies and expired materials. Each principal investigator should decide on whether all field team members need to be certified in first aid procedures (e.g. Red Cross certification).

Navigation/Remote Sites: Adequate navigational equipment should be available if travelling to remote

sites. All users should be familiar with the use of the equipment (e.g., GPS units).

Social/Cultural Consideration: If the fieldwork has the potential for interaction with people of other cultures, the principal investigator is responsible for the training of field personnel with respect to relevant social or cultural considerations.

Transportation Considerations

Driver Certification: Students, staff and faculty driving University owned, leased, or rented vehicles must

be in the University Vehicle Safety Program. The University's Vehicle Safety Program can be found online

at Vehicle Safety Program (astate.edu).

Use of Personal Vehicle

Unless logistically unfeasible, it is strongly recommended that a University vehicle be used for all University-sponsored research trips involving transportation of students, staff, and faculty. This ensures

that the University's insurance coverage applies to any accidents and loss prevention measures.

The

University's auto liability insurance applies to only University owned, leased or rented vehicles;

personal

vehicles are not covered. The principal investigator/research supervisor is responsible for identifying

funds to cover the cost of department vehicle use or vehicle rental. Rental arrangements must be made

through the Travel Services.

Note that the University's auto liability insurance policy applies to University owned, leased, or rented

vehicles driven by University-approved drivers while in the United States. If research requiring vehicle

use occurs outside of the US, auto insurance must be purchased separately. In such situations, the principal investigator/research supervisor is responsible for identifying funds to cover the cost of auto

insurance.

The use of personal vehicles for University-sponsored research is strongly discouraged. If it is absolutely

necessary that a student/employee use a personal vehicle in conjunction with University-sponsored research, the student or staff member must be advised in writing that their own auto insurance is the

only insurance that would respond in the event of an accident/incident with their own vehicle even while on University business. The student/employee, and specifically the person named on the vehicle's

insurance policy, assumes full insurance risk. For any student/employee that uses a personal vehicle in

the execution of research, Appendix D, Acknowledgement- Use of Personal Automobile form, must be

completed by the owner of the vehicle prior to the travel. The signed Acknowledgement form must be

retained by the Department for a period of three years from the date of the vehicle's use in accordance

with the University's record retention policy.

Students/employees have the right to refuse using a personal vehicle for research, with no repercussions. If a personal vehicle is used, the student/employee is entitled to mileage reimbursement

at the standard University rate. In such situations, the principal investigator/research supervisor is responsible for identifying funds to cover the cost mileage reimbursement.

Non-University Employees: Non-University employees are permitted to travel in University vehicles, but

must sign and submit, Appendix D, Acknowledgement – Use of Personal Automobile before travel begins. University students, employees and registered volunteers may travel in University vehicles and

may apply to become certified drivers of University vehicles.

In the event of a motor vehicle accident

1. Call 911
2. Injury evaluation of all persons.
3. Call supervisor
4. Call motor pool

5. Call risk management
6. Call insurance company. Card is found in vehicle.
7. You must request a copy of the police report. Have it sent to risk@astate.edu

Emergency Contact Information

Emergency Contacts Number Notes

Emergency Services 911 Contact first in any life threatening emergency.

University Police Department 870-972-2093 Contact in the event an accident happened on campus.

University Risk Management 870-972-2817 Contact in the event that any Arkansas State owned or rented vehicle is involved in an accident, and following any emergency in which emergency services were contacted.

University Motor Pool 870-972-3904 Contact in the event that any Arkansas State owned or rented vehicle is involved in an accident.

University Travel Services 870-972-3903 Contact in the event that any Arkansas State rented vehicle is involved in an accident.

List of Appendices

Appendix A – Field Communication Plan Sample

Appendix B – Field Safety Plan Example

Appendix C – Arkansas State University Off-campus incident/accident/injury report

Appendix D – Use of Personal Automobile Consent Form

Appendix E - Release of All Claims for Personal Injury and Property, Student and Arkansas State Employees Operating Boats or All-Terrain Vehicles

Appendix F – Release of All Claims for Personal Injury and Property Damage Student Travel Participation

APPENDIX A

EXAMPLES

Field Communication Plan

1. A field research crew that includes undergraduate students conducts field work at tidal marsh field sites on the Delaware River which is accessed by boat. The PI develops a communications protocol, and requires that a cell phone (in a water-proof case) accompany the field crew at all times. When the field crew anchors the boat and conducts research in the marsh, the cell phone must accompany them to avoid a circumstance where the boat loses anchor and floats away stranding the field crew. The field crew files a research plan with the PI (if the PI does not accompany the crew) or with the PI's spouse (if the PI does accompany the crew) before leaving. The field plan details the sites (including lat/lon)

and
approximate times that the sites will be visited. The field plan also notes a time by which
emergency
services should be notified in the event that communication between the field crew and the
emergency
contact cannot be established.

2. An undergraduate student obtains an Arkansas State Undergraduate Research Fellowship to
conduct
periodic individual field research in forests close to their home in upstate New York during the
summer.

The student fills out a new field research plan that includes her parents as the emergency contact,
and
she gives this research plan to her parents before departing on field work. The student's parents
institute emergency procedures if the student has not been in contact by the pre-determined time.

In
this scenario, the PI is not necessarily contacted prior to every field trip. See Detailed Example Field
Plan (see attached-Appendix B).

APPENDIX B

EXAMPLE

Student Field Research Safety Protocol

General Information Principal Investigator Nathaniel Weston

Field Research Program Delaware River Estuary

Brief Description of Research Field research is conducted at tidal freshwater and
saltwater marsh sites along the Delaware River.

Sites are accessed by land or by boat. Activities
include measuring rates of gas exchange,
measuring and collecting plant biomass and soil
samples, installing surface elevation tables (SETs)
and boardwalks, measuring SETs and conducting
GPS surveys.

Communications - Phone Numbers

Emergency

911

Arkansas State University Police 870-972-2093

Principle Investigator's Cell Phone Nathaniel
Weston

xxx.xxx.xxxx

Principle Investigator's Office Phone Nathaniel
Weston

xxx-xxx-xxxx

Department Office

Arkansas State Risk Management Sandra

Bramblet

870-972-2817

Communications Protocol

Communications Instrument Every group conducting field research must have a
cell phone with them, including on the boat when

field access by boat is required.

Emergency Communication Protocol Call 911 in any life-threatening or potentially lifethreatening emergency. 911 will put you in contact with the Coast Guard as well as other emergency services, in cases of boat failure. If, after emergency service have been contacted you are able to, contact Arkansas State University Public Safety, the Principal Investigator, and the department to alert them to the situation. If a motor-vehicle or boating accident has occurred, contact Ashley Feick.

Field Research Plans

Field Research Plan A third party (Angie Fondaco, Dr. Frank Galgano, a member of the laboratory, etc) not accompanying the field research team must be informed of the field plans and again informed when the field crew has returned. The location of sites visited and anticipated timing of the trip needs to be communicated. This person is responsible for contacting the field crew if they have not returned within a reasonable amount of time.

Personnel Requirements

Number of researchers There must be 2 or more persons in any field research trip to tidal marsh sites. Undergraduate students must be accompanied by a graduate student, technician, post-doc or PI.

Personal Training

First Aid / CPR All personnel conducting significant (i.e., PI, technician, student summer researchers) field research must be Red Cross First Aid and CPR trained. A copy of the certification will be kept on file.

Boat Training All personnel leading field research trips that include boat use are required to take a boat education course and be Arkansas Boater Education certified. These certificates will be kept on file.

Safety Equipment

First-aid Kit A fully stocked first aid kit must be available in the vehicle and boat when in use.

Boat Safety Kit A boat safety kit, including a whistle, horn, fireextinguisher, a lifejacket (one per passenger), and a throwable life-saving device (cushions) must be on board the boat during operation.

Transportation Protocol

Truck and Trailer Operation Only authorized personnel may operate the field

truck with the boat-trailer attached. Special consideration must be given to driving the truck with the boat-trailer attached. Undergraduate students may not drive the truck when the boat trailer is attached. Undergraduate students may operate the truck if van certified by the University.

Boat Operation Only personnel possessing an Arkansas Boating Safety Certificate and approved by the Principal Investigator are authorized to operate the boat.

Hazards-Physical

Water A significant portion of this research is conducted on (in a boat), near (in tidal marshes) or in (wading) water. Personnel who do not know how to swim should wear a lifejacket when appropriate. During colder field conditions when wearing waders, be aware that falling into water with waders on is extremely dangerous. Waders will fill with water and make surfacing difficult. If your waders fill with water and you are unable to surface, remove them as quickly as possible.

Boating Travel by boat must be conducted safely. The boat utilizes an outboard engine with a propeller that will do significant bodily damage if the motor is in gear. Persons should never be near the rear of the boat when the engine is on, even in neutral. An additional hazard in travelling by boat is that the boat may unexpectedly strike objects in the water, causing persons who are standing to fall. Always sit while the boat is in motion.

Never smoke or use open flame or spark in the boat. The boat is powered by a gasoline/oil mix stored in portable containers. These containers are not fully sealed (they need to be vented) and thus risk of fire and explosion is present. Always remove the gas tanks from the boat when filling. The boat may not be operated between sunset and sunrise.

Walking in the Tidal Marsh Traversing portions of tidal marsh are an inevitable part of field research. Proper footwear must be worn at all times (close-toed, tightly laced shoes, boots, or waders). Do not overload yourself when walking in the marsh.

Walking on boardwalks poses the threat of slipping and falling. Mud causes boardwalks to be slick. Take care when walking on boardwalks.

Heat, Sunburn, Dehydration On hot, sunny days, care must be taken to avoid

dehydration, sunburn and overheating. Drink water, wear sunscreen and protective clothing, and take adequate breaks.

Frostbite, hypothermia On cold days, care must be taken to avoid frostbite, lowering of core body temperature and hypothermia. Wear protective clothing (waders, multiple layers, gloves).

Hazards-Biological

Marsh plants Several of the plants encountered in the tidal marsh field sites (*Zizania aquatica* at Salem and *Polygonum* at Rancocas) are abrasive and will cause slight skin rashes. Wear long pants and long sleeves when working at these sites in late summer and fall. Some plants also pose the risk of causing puncture wounds. Be attentive and utilize protective eye wear when appropriate.

Black flies, mosquitoes and green-heads At some times of year, biting insects (black flies, mosquitoes and green-heads) will be found in tidal marsh ecosystems. Wear protective clothing (long pants and long sleeves) and use insect repellent to minimize exposure.

Ticks and Lyme disease Ticks in the mid-Atlantic region may carry Lyme disease. Wear protective clothing and use insect repellent. If you find a tick on yourself, remove it promptly. If tick bites are detected, monitor yourself for signs of Lyme disease and promptly seek medical attention if found.

Hazards-Chemical

Not applicable

Hazards-Specific Field Equipment

Generator A gasoline powered generator may be used in the field. The generator produces an electric current (120 V) which is hazardous in wet conditions such as a tidal marsh. Take care to site the generator so that it does not come in contact with water. If an extension cord is used, be sure that the termination of the extension cord and any connections do not come in contact with water.

No smoking or open flames may be near the generator, due to the possibility of gasoline fumes igniting.

Demolition Hammer The demolition hammer produces potentially damaging levels of noise. Wear protective ear gear when using or working near the demolition hammer. The demolition hammer and the stainless steel rod that is hammered become extremely hot. Use caution when handling after

hammering.

Grinder The grinder will cause significant bodily harm if it comes into contact with your person while in operation. Use caution. The stainless steel rod is also extremely hot following cutting with the grinder, and should be cooled before handling.

GPS tripod The spikes on several of the tripods used for the GPS equipment are sharp, and will cause bodily injury if mishandled. Take care when using and transporting this equipment.

Signatures

I have read and understand these safety protocols and procedures, and I will follow these policies and procedures.

Name Date

Principal Investigator Date

APPENDIX C

ARKANSAS STATE UNIVERSITY

OFF CAMPUS INCIDENT/ACCIDENT/INJURY REPORT

Please go the Risk Management to complete the Incident Reporting Form or use this link:

Incident Report • CampusOptics

APPENDIX D

ACKNOWLEDGEMENT – USE OF PERSONAL AUTOMOBILE

To be signed by the Vehicle Owner; Student Vehicles owned by Parents must be signed by Parent I, the undersigned, acknowledge that I am the owner of the following vehicle (the “Vehicle”):

_____ (Year, Make and Model) _____

(License Plate #)

I understand that the Vehicle is contemplated to be used in connection with travel to and from a field

research location at _____ during the period from _____ to _____ (the “Field Work”) in connection with a class or research project sponsored by Arkansas State University (“University”).

I acknowledge that the use of my Vehicle for travel to and from the Field Work location is completely

voluntary. I understand that other options for transportation to the Field Work site have been made available by the University, either in the form of University-owned vehicles or University-rented vehicles.

I understand that University does not carry or maintain automobile insurance coverage or any other

insurance coverage for my Vehicle in connection with the Field Work. Any personal injury or property

damage sustained by me or third parties that occurs in connection with the use of the Vehicle for the

Field Work will not be covered by the University but, rather, will be subject to my own personal auto

insurance coverage.

I understand that I will be reimbursed for mileage at the standard University rate.

I represent that I have adequate automobile insurance to cover any personal injury to myself or any

third party or property damage owed by me or any third party that may arise out of the use of the Vehicle for the transportation to and from the Field Work.

I understand that I must provide proof of insurance and submit a copy to the PI or department head,

before travel commences. Attach proof to this document.

Acknowledging all of the above, I hereby grant permission for the Vehicle to be used for transportation

to and from the Field Work location.

I certify that I have read and understand the above statements and that they are true and accurate, and

that the signing of this Acknowledgement is voluntary.

READ ABOVE CAREFULLY BEFORE SIGNING BELOW.

Student/Employee Driver's Printed Name: _____ ASTATE ID: _____

Student/Employee Driver's Signature: _____ Date: _____

(Please sign in ink. Typed signatures are not acceptable)

Vehicle Owner's Printed Name (if different than above): _____

Vehicle Owner's Signature (if different than above): _____ Date: _____

(Please sign in ink. Typed signatures are not acceptable)

Appendix E

RELEASE OF ALL CLAIMS FOR PERSONAL INJURY AND PROPERTY DAMAGE

STUDENT AND ARKANSAS STATE EMPLOYEES OPERATING BOATS OR ALL-TERRAIN VEHICLES

I, (name): _____, a student or employee at Arkansas State University over the age

of eighteen (18) will be using or participating in an activity where a boat, motor boat, canoe, kayak, raft, tube

or all-terrain vehicle (the "Boat/ATV") will be used. I will be at the following location(s) during this activity

_____ on _____ (date(s)).

I AM AWARE that using or participating in travel when using a boat or all-terrain vehicle carries the risk of

personal injury, property damage, or other losses.

I HEREBY FULLY RELEASE AND DISCHARGE Arkansas State University, the Arkansas State University System,

its Board of Trustees, its officers, agents, and employees from any liability for negligence and all claims for

personal injury, property damage, or other losses resulting from my participation in operating a Boat/ATV or

participating in an activity that uses such Boat/ATV vehicles.

I HEREBY ASSUME ALL RISKS of personal injury, property damage, or other losses resulting from my

participation in operating a Boat/ATV or participating in an activity that uses such Boat/ATV vehicles.

I FURTHER AGREE TO INDEMNIFY AND HOLD HARMLESS Arkansas State University, the Arkansas State University System, its Board of Trustees, its officers, agents, and employees from all claims, suits, actions, injuries, damages, and losses sustained by me and arising out of, connected with, or in any way associated with participation in an activity that uses a Boat/ATV vehicle.

I HAVE FULLY READ AND UNDERSTAND THE FOREGOING. I agree to the terms and conditions as stated.

Initial the following:

I shall obey all state, federal and local boating and recreational regulations, laws, ordinances, and lawful directives from appropriate emergency or law enforcement personnel, while operating a boat or all-terrain vehicle. The student or employee of Arkansas State University is solely responsible for any citation or violation occurring during the use of, or the result of using a boat or all-terrain vehicle.

Who Needs a Boating Education Card?

Anyone born on or after Jan. 1, 1986, and of legal age to operate a motorboat or sailboat, must have successfully completed an approved AGFC Boating Education Course and carry proof while operating a motorboat or sailboat on Arkansas water.

- To operate a motorboat powered by an engine of 10 horsepower or more, a person must be 12 or older, or be under the direct supervision of a person at least 18 years old.
- To operate a personal watercraft, a person must be 16 or older, be 12 to 15 years old and be under the direct supervision of a person at least 18 years old or be under 12 and be under the direct supervision of a person at least 21 years old.

STUDENT or EMPLOYEE NAME (Print) _____

STUDENT or EMPLOYEE NAME (Signature) _____ DATE _____

Department _____

*Department Contact _____ Contact Phone Number _____

*Attach form to appropriate travel request and submit to Travel Services PRIOR TO TRAVEL.

Appendix F

RELEASE OF ALL CLAIMS FOR PERSONAL INJURY AND PROPERTY DAMAGE STUDENT TRAVEL PARTICIPATION

student-trip-release.pdf (astate.edu)

I, _____, a student at Arkansas State University over the age of eighteen (18),

have chosen to participate in student travel to _____ on _____.

I AM AWARE that participating in travel carries the risk of personal injury, property damage, or other losses.

I HEREBY FULLY RELEASE AND DISCHARGE Arkansas State University, the Arkansas State University System, its Board of Trustees, officers, agents, and employees from any and all claims for personal injury, property damage, or other losses up to and including death, resulting from my participation in this travel.

I HEREBY ASSUME ALL RISK of personal injury, property damage, and other losses up to and including death

which may result from my participation in this travel.

I FURTHER AGREE TO INDEMNIFY AND HOLD HARMLESS Arkansas State University, its , the Arkansas State

University System, its Board of Trustees, officers, agents, and employees from all claims, suits, actions,

injuries, damages, and losses sustained by me and arising out of, connected with, or in any way associated

with my participation in this travel.

I HAVE FULLY READ AND UNDERSTAND THE FOREGOING

STUDENT (print name)_____

STUDENT (Signature)_____ DATE _____

Department _____

*Department Contact _____ Contact Phone Number _____

*Attach form to appropriate travel request and submit to Travel Services PRIOR TO TRAVEL.

Medical Surveillance

Occupational Health & Safety Medical Surveillance

While EHS strives to provide services and guidance in all areas of workplace safety compliance, there are

some situations where outside expertise is necessary. A-State does not employ an Occupational Health

Specialist and there are areas where that type of physician is necessary to meet safety, health and compliance requirements. If your job involves any of the following, then enrollment in medical surveillance may be necessary:

- Work with animals in research
- Work with blood or other potentially infectious materials from humans (or non-human primates)
- Work that requires the use of a respirator

Enrollment in medical surveillance is simple.

1) Contact Environmental Health and Safety (mdooley@astate.edu) or call 870-972-3644 to get started.

2) Fill out the Medical Surveillance Form.

3) Take the form to your appointment with Occupational Health Partners (EHS will help set up this appointment).

4) Occupational Health Partners will follow up with you if any additional action is necessary (immunizations, consults with your personal physician, etc.).

Note that special training is required for any of the job functions that require you to be enrolled in medical surveillance. Please contact EHS for details based on your specific job requirements.

Medical Surveillance Form

ARKANSAS STATE UNIVERSITY, MEDICAL SURVEILLANCE PROGRAM

General Information

Full Name: _____

Date of Birth: _____

What possible hazardous exposures exist in your position/research?

Animals: ☐ Lab animals (mice/rats/guinea pigs, etc.) ☐ Birds

☐ Farm animals ☐ Wild animals ☐ Insects

☐ Aquatic animals

Human or primate: ☐ Blood ☐ Tissues, fluids or other potentially infectious materials

☐ Human cell culture

Environmental: ☐ Chemicals ☐ Dust ☐ Noise

Will you be exposed to animals that may have rabies? ☐ Yes ☐ No

Will you be involved in recombinant DNA or human gene transfer research? ☐ Yes ☐ No

Are you pregnant or planning to become pregnant in the near future? ☐ Yes ☐ No

Medical History ☐ I have no significant medical history

Current medications: _____ ☐ None

☐ Anemia ☐ Hearing Problems ☐ Rheumatic/Scarlet Fever

☐ Arthritis ☐ Heart Problems ☐ Seizures/Epilepsy

☐ Cancer ☐ Heat Stroke ☐ Stomach/Bowel Problems

☐ Diabetes ☐ High Blood Pressure ☐ Tuberculosis

☐ Difficulty Smelling ☐ Joint or Muscle Problems ☐ Vision Problems

☐ Dizziness or Fainting ☐ Kidney or Liver Disease

☐ Other: _____

Do you have a medical condition that impairs your immune system (HIV, chemotherapy, radiation, etc.)?

☐ Yes ☐ No

Allergy History

Do you currently have or have you ever had any of the following conditions?

Asthma/Wheezing? ☐ Yes ☐ No If yes, when? _____

Chronic cough/Bronchitis? ☐ Yes ☐ No If yes, when? _____

Eczema/Skin rash? ☐ Yes ☐ No If yes, when? _____

Hay fever/Seasonal allergies? ☐ Yes ☐ No If yes, when? _____

Itchy, irritated eyes? ☐ Yes ☐ No If yes, when? _____

Shortness of breath? ☐ Yes ☐ No If yes, when? _____

Other lung/breathing problems? ☐ Yes ☐ No If yes, when? _____

Allergies to food or medicine? ☐ Yes ☐ No

If yes, list: _____

Allergies to pollen, grass, weeds, trees, yeas or molds? ☐ Yes ☐ No

If yes, list: _____

Allergies to latex, chemicals or other substances? ☐ Yes ☐ No

If yes, list: _____

Allergies to animals? ☐ Yes ☐ No

If yes, list: _____

Immunization History

Tetanus: Td _____ or Tdap _____

Hepatitis B _____ (date of series completion if there is risk of exposure to human or primate derived materials)

Rabies: _____ (if applicable)

The above information is accurate to the best of my knowledge.

CHEMICAL COMPATIBILITY STORAGE CODES

Storage Group A: Compatible Organic Bases

Identifier Name

100-46-9 Benzylamine
100-85-6 Benzyltrimethylammonium hydroxide
108-91-8 Cyclohexylamine
111-42-2 Diethanolamine
109-89-7 Diethylamine
75-04-7 Ethylamine
107-15-3 Ethylenediamine
110-89-4 Piperidine
102-71-6 Triethanolamine
121-44-8 Triethylamine

Storage Group B: Compatible Pyrophoric And Water Reactive Materials

Identifier Name

7783-70-2 Antimony pentafluoride
98-88-4 Benzoyl chloride
353-42-4 Boron trifluoride compound with methyl ether (1:1)
594-19-4 Tert-Butyllithium
156-62-7 Calcium cyanamide
16853-85-3 Lithium aluminum hydride
4111-54-0 Lithium diisopropylamide
7580-67-8 Lithium hydride
7439-93-2 Lithium metal (e.g., in THF)
124-63-0 Methanesulfonyl chloride
917-54-4 Methyllithium solution (and other alkyls)
7440-09-7 Potassium metal
17242-52-3 Potassium amide
16940-66-2 Sodium borohydride
7646-69-7 Sodium hydride
7440-66-6 Zinc (fume or dust)

Storage Group C: Compatible Inorganic Bases

Identifier Name

1336-21-6 Ammonium hydroxide
17194-00-2 Barium hydroxide
1305-62-0 Calcium hydroxide
21351-79-1 Cesium hydroxide
1310-65-2 Lithium hydroxide

Lawrence M.

Gibbs, Stanford University.

1310-58-3 Potassium hydroxide

1310-82-3 Rubidium hydroxide

1310-73-2 Sodium hydroxide

18480-07-4 Strontium hydroxide

Storage Group D: Compatible Organic Acids

Identifier Name

64-19-7 Acetic acid

79-10-7 Acrylic acid

65-85-0 Benzoic acid

98-07-7 Benzotrichloride

98-88-4 Benzoyl chloride

10043-35-3 Boric acid

79-11-8 Chloroacetic acid

627-11-2 Chloroethyl chloroformate

77-92-9 Citric acid

79-44-7 Dimethylcarbamyl chloride

64-18-6 Formic acid

6915-15-7 Malic acid

108-31-6 Maleic anhydride

7697-37-2 Nitric acid

139-13-9 Nitrilotriacetic acid

79-09-4 Propionic acid

7783-00-8 Selenious acid

76-05-1 Trifluoroacetic acid (TFA)

76-03-9 Trichloroacetic acid

Storage Group E: Compatible Oxidizers, Including Peroxides

Identifier Name

21205-91-4 9-BBN

13473-90-0 Aluminum nitrate

7789-09-5 Ammonium dichromate

7790-98-9 Ammonium perchlorate

13446-10-1 Ammonium permanganate

7727-54-0 Ammonium persulfate

10022-31-8 Barium nitrate

10124-37-5 Calcium nitrate

1305-79-9 Calcium peroxide

19004-19-4 Cupric nitrate

506-93-4 Guanidine nitrate

937-14-4 3-Chloroperoxybenzoic acid

7722-84-1 Hydrogen peroxide

10099-74-8 Lead nitrate

13840-33-0 Lithium hypochlorite

10377-60-3 Magnesium nitrate

10034-81-8 Magnesium perchlorate

13138-45-9 Nickel nitrate

7697-37-2 Nitric acid
79-21-0 Peracetic acid
7601-90-3 Perchloric acid
7778-50-9 Potassium dichromate
7757-79-1 Potassium nitrate
7722-64-7 Potassium permanganate
7727-21-1 Potassium persulfate
17014-71-0 Potassium superoxide
7761-88-8 Silver nitrate
15630-89-4 Sodium carbonate peroxide
7775-09-9 Sodium chlorate
7758-19-2 Sodium chlorite
2893-78-9 Sodium dichloro-s-triazinetriene
10588-01-9 Sodium dichromate
7681-52-9 Sodium hypochlorite
7631-99-4 Sodium nitrate
7632-00-0 Sodium nitrite
10101-50-5 Sodium permanganate
1313-60-6 Sodium peroxide
7775-27-1 Sodium persulfate
7791-10-8 Strontium chlorate
10042-76-9 Strontium nitrate
1314-18-7 Strontium peroxide
87-90-1 Trichloro-s-triazinetriene (Trichloroisocyanuric acid, TCCA)

Storage Group F: Compatible Inorganic Acids, Not Including Oxidizers Or Combustibles

Identifier Name

7790-93-4 Chloric acid
10034-85-2 Hydriodic acid
7647-01-0 Hydrochloric acid
7664-39-3 Hydrogen fluoride solution
7664-38-2 Phosphoric acid
7664-93-9 Sulfuric acid

Storage Group G: Not Intrinsically Reactive Or Flammable Or Combustible

Identifier Name

71751-41-2 Abamectin [avermectin b1]
640-19-7 Acetamide, 2-fluoro-
62-74-8 Acetic acid, fluoro-, sodium salt
1752-30-3 Acetone thiosemicarbazide
53-96-3 2-Acetylaminofluorene
79-06-1 Acrylamide
814-68-6 Acrylyl chloride
111-69-3 Adiponitrile
309-00-2 Aldrin
60-09-3 4-Aminoazobenzene
92-67-1 4-Aminodiphenyl
82-28-0 1-Amino-2-methylantraquinone
54-62-6 Aminopterin

504-24-5 4-Aminopyridine
61-82-5 Amitrole
101-05-3 Anilazine [4, 6-dichloro-N-(2-chlorophenyl)-1, 3, 5-triazin-2-amine]
90-04-0 o-Anisidine
7440-36-0 Antimony
7440-38-2 Arsenic
1303-28-2 Arsenic pentoxide
7784-34-1 Arsenic trichloride
1327-53-3 Arsenic trioxide
86-50-0 Azinphos-methyl
7440-39-3 Barium
56-55-3 Benz[a]anthracene
98-87-3 Benzal chloride
55-21-0 Benzamide
98-16-8 Benzenamine, 3-(trifluoromethyl)-
100-14-1 Benzene, 1-(chloromethyl)-4-nitro-
98-05-5 Benzenearsonic acid
108-98-5 Benzenethiol
92-87-5 Benzidine
50-32-8 Benzo[a]pyrene
57-64-7 Benzoic acid, 2-hydroxy-, compound with (3a-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3,b]indol-5-ylmethylcarbamate ester (1:1)
100-44-7 Benzyl chloride
140-29-4 Benzyl cyanide
7440-41-7 Beryllium powder
91-59-8 Beta-naphthylamine
82657-04-3 Bifenthrin
92-52-4 Biphenyl
534-07-6 Bis(chloromethyl) ketone
542-88-1 Bis(chloromethyl)ether
28772-56-7 Bromadiolone
75-25-2 Bromoform (tribromomethane)
74-83-9 Bromomethane
75-63-8 Bromotrifluoromethane (halon 1301)
81-88-9 C.I. Food red 15 (Rhodamine B)
97-56-3 C.I. Solvent yellow 3
7440-43-9 Cadmium
1306-19-0 Cadmium oxide
2223-93-0 Cadmium stearate
7778-44-1 Calcium arsenate
56-25-7 Cantharidin
51-83-2 Carbachol chloride
644-64-4 Carbamic acid, dimethyl-, 1-[(dimethylamino)carbonyl]-5-methyl-1h-pyrazol-3-yl ester
63-25-2 Carbaryl [1-naphthalenol, methylcarbamate]
1563-66-2 Carbofuran
56-23-5 Carbon tetrachloride
57-74-9 Chlordane

115-28-6 Chlorendic acid
532-27-4 2-Chloroacetophenone
4080-31-3 1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride
75-45-6 Chlorodifluoromethane (HCFC-22)
67-66-3 Chloroform
107-30-2 Chloromethyl methyl ether
5344-82-1 1-(o-Chlorophenyl)thiourea
542-76-7 3-Chloropropionitrile
63938-10-3 Chlorotetrafluoroethane
75-88-7 2-Chloro-1,1,1-trifluoro-ethane (HCFC-133a)
75-72-9 Chlorotrifluoromethane (CFC-13)
1982-47-4 Chloroxuron
10025-73-7 Chromic chloride
7440-47-3 Chromium
64-86-8 Colchicine
56-72-4 Coumaphos
5836-29-3 Coumatetralyl
1319-77-3 Cresol (mixed isomers)
95-48-7 o-Cresol
535-89-7 Crimidine
4170-30-3 Crotonaldehyde
123-73-9 (e)-Crotonaldehyde
64-00-6 m-Cumenyl methylcarbamate
21725-46-2 Cyanazine
506-68-3 Cyanogen bromide
506-78-5 Cyanogen iodide
675-14-9 Cyanuric fluoride
66-81-9 Cycloheximide
94-75-7 2,4-D (2,4-Dichlorophenoxyacetic acid)
2971-38-2 2,4-D Chlorocrotyl ester
94-11-1 2,4-D Isopropyl ester
94-82-6 2,4-DB
919-86-8 Demeton-s-methyl
101-80-4 4,4'-Diaminodiphenyl ether
101-77-9 4,4'-Diaminodiphenylmethane
615-05-4 2,4-Diaminoanisole
95-80-7 2,4-Diaminotoluene
25376-45-8 Diaminotoluene (mixed isomers)
333-41-5 Diazinon
53-70-3 Dibenzo(a, h)anthracene
132-64-9 Dibenzofuran
96-12-8 1,2-Dibromo-3-chloropropane
106-93-4 1,2-Dibromoethane (ethylene dibromide)
84-74-2 Dibutyl phthalate
99-30-9 Dichloran [2, 6-dichloro-4-nitroaniline]
95-50-1 1,2-Dichlorobenzene
541-73-1 1,3-Dichlorobenzene

106-46-7 1,4-Dichlorobenzene
91-94-1 3,3'-Dichlorobenzidine
75-27-4 Dichlorobromomethane
764-41-0 1,4-Dichloro-2-butene
75-71-8 Dichlorodifluoromethane (cfc-12)
111-44-4 Dichloroethyl ether
75-09-2 Dichloromethane (methylene chloride)
91-93-0 3,3'-Dimethoxybenzidine-4,4'-diisocyanate
91-97-4 3,3'-Dimethyl-4,4'-diphenylene diisocyanate
127564-92-5 Dichloropentafluoropropane
97-23-4 Dichlorophene [2, 2'-methylene-bis(4-chlorophenol)]
120-83-2 2,4-Dichlorophenol
105-67-9 2,4-Dimethylphenol
696-28-6 Dichlorophenylarsine
76-14-2 Dichlorotetrafluoroethane (cfc-114)
62-73-7 Dichlorvos
1464-53-5 Diepoxybutane
38727-55-8 Diethyl ethyl
814-49-3 Diethyl chlorophosphate
297-97-2 O,O-Diethyl O-pyrazinyl phosphorothioate
78-53-5 O,O-Diethyl S-[2-(diethylamino)ethyl] phosphorothiolate
71-63-6 Digitoxin
101-90-6 Diglycidyl resorcinol ether
94-58-6 Dihydrosafrole
55-91-4 Diisopropylfluorophosphate (DFP)
60-51-5 Dimethoate
60-11-7 4-Dimethylaminoazobenzene
57-97-6 7,12-Dimethylbenz[a]anthracene
91-93-0 3,3'-Dimethoxybenzidine-4,4'-diisocyanate
2524-03-0 Dimethyl chlorothiophosphate
91-97-4 3,3'-Dimethyl-4,4'-diphenylene diisocyanate
105-67-9 2,4-Dimethylphenol
131-11-3 Dimethyl phthalate
77-78-1 Dimethyl sulfate
2300-66-5 Dimethylamine dicamba
534-52-1 4,6-Dinitro-o-cresol
78-34-2 Dioxathion
82-66-6 Diphacinone
957-51-7 Diphenamid
122-39-4 Diphenylamine
107-49-3 Diphosphoric acid, tetraethyl ester
541-53-7 Dithiobiuret
72-20-8 Endrin
50-14-6 Ergocalciferol
563-12-2 Ethion
13194-48-4 Ethoprop
541-41-3 Ethyl chloroformate

759-94-4 Ethyl dipropylthiocarbamate [EPTC]
371-62-0 Ethylene fluorohydrin
107-21-1 Ethylene glycol
96-45-7 Ethylene thiourea
542-90-5 Ethylthiocyanate
52-85-7 Famphur
55-38-9 Fenthion [o, o-dimethyl o-[3-methyl-4-(methylthio)phenyl]ester, phosphorothioic acid]
144-49-0 Fluoroacetic acid
359-06-8 Fluoroacetyl chloride
51-21-8 Fluorouracil
944-22-9 Fonofos
107-16-4 Formaldehyde cyanohydrin
23422-53-9 Formetanate hydrochloride
76-13-1 Freon 113 [ethane, 1, 1, 2-trichloro-1, 2, 2-trifluoro-]
76-44-8 Heptachlor
87-68-3 Hexachloro-1, 3-butadiene
118-74-1 Hexachlorobenzene
77-47-4 Hexachlorocyclopentadiene
67-72-1 Hexachloroethane
1335-87-1 Hexachloronaphthalene
70-30-4 Hexachlorophene
822-06-0 Hexamethylene-1, 6-diisocyanate
51235-04-2 Hexazinone
51-75-2 Hn2 (nitrogen mustard-2)
555-77-1 Hn3 (nitrogen mustard-3)
79-19-6 Hydrazinecarbothioamide
123-31-9 Hydroquinone
102-36-3 Isocyanic acid, 3,4-dichlorophenyl ester
465-73-6 Isodrin
4098-71-9 Isophorone diisocyanate
108-23-6 Isopropyl chloroformate
80-05-7 4,4'-Isopropylidenediphenol
120-58-1 Isosafrole
78-97-7 Lactonitrile
7439-92-1 Lead
58-89-9 Lindane
554-13-2 Lithium carbonate
121-75-5 Malathion
109-77-3 Malononitrile
93-65-2 Mecoprop
950-10-7 Mephosfolan
149-30-4 2-Mercaptobenzothiazole (MBT)
5124-30-1 1,1-Methylene bis(4-isocyanatocyclohexane)
1600-27-7 Mercuric acetate
7487-94-7 Mercuric chloride
21908-53-2 Mercuric oxide
7439-97-6 Mercury

760-93-0 Methacrylic anhydride
920-46-7 Methacryloyl chloride
30674-80-7 Methacryloyloxyethyl isocyanate
558-25-8 Methanesulfonyl fluoride
950-37-8 Methidathion
16752-77-5 Methomyl
94-74-6 Methoxone (4-chloro-2-methylphenoxy) acetic acid (MCPA))
72-43-5 Methoxychlor [benzene, 1, 1'-(2, 2, 2-trichloroethylidene)bis[4-methoxy-]]
151-38-2 Methoxyethylmercuric acetate
80-63-7 Methyl 2-chloroacrylate
56-49-5 3-Methylcholanthrene
74-87-3 Methyl chloride
101-14-4 4,4'-Methylenebis(2-chloroaniline) (mboca)
101-61-1 4,4'-Methylenebis(N,N-dimethyl) benzenamine
60-34-4 Methyl hydrazine
74-88-4 Methyl iodide
924-42-5 N-Methylolacrylamide
298-00-0 Methyl parathion
676-97-1 Methyl phosphonic dichloride
556-64-9 Methyl thiocyanate
502-39-6 Methylmercuric dicyanamide
7786-34-7 Mevinphos
90-94-8 Michler's ketone
50-07-7 Mitomycin c
1313-27-5 Molybdenum trioxide
76-15-3 Monochloropentafluoroethane (CFC-115)
6923-22-4 Monocrotophos
3173-72-6 1,5-Naphthalene diisocyanate
54-11-5 Nicotine
65-30-5 Nicotine sulfate
92-93-3 4-Nitrobiphenyl
55-63-0 Nitroglycerine
88-75-5 2-Nitrophenol
100-02-7 4-Nitrophenol
62-75-9 N-Nitrosodimethylamine
621-64-7 N-Nitrosodi-N-propylamine
86-30-6 N-Nitrosodiphenylamine
59-89-2 N-Nitrosomorpholine
100-75-4 N-Nitrosopiperidine
99-55-8 5-Nitro-o-toluidine
630-60-4 Ouabain
78-71-7 Oxetane, 3,3-bis(chloromethyl)-
104-94-9 p-anisidine
56-38-2 Parathion
12002-03-8 Paris green
106-47-8 p-chloroaniline
95-69-2 p-chloro-o-toluidine

106-44-5 p-cresol
100-25-4 p-dinitrobenzene
76-01-7 Pentachloroethane
87-86-5 Pentachlorophenol (PCP)
594-42-3 Perchloromethylmercaptan
85-01-8 Phenanthrene
108-95-2 Phenol
88-85-7 Phenol, 2-(1-methylpropyl)-4,6-dinitro- (dinoseb)
58-36-6 Phenoxarsine, 10,10'-oxydi-
95-54-5 1,2-Phenylenediamine
108-45-2 1,3-Phenylenediamine
624-18-0 1,4-Phenylenediamine dihydrochloride
104-49-4 1,4-Phenylene diisocyanate
59-88-1 Phenylhydrazine hydrochloride
62-38-4 Phenylmercury acetate
90-43-7 2-Phenylphenol
2097-19-0 Phenylsilatrane
103-85-5 Phenylthiourea
57-41-0 Phenytoin
947-02-4 Phosfolan
13171-21-6 Phosphamidon
57-47-6 Physostigmine
124-87-8 Picrotoxin
51-03-6 Piperonyl butoxide
100-01-6 p-nitroaniline
10124-50-2 Potassium arsenite
506-61-6 Potassium silver cyanide
106-50-3 p-phenylenediamine
23950-58-5 Pronamide
1120-71-4 Propane sultone
70-69-9 Propiophenone, 4'-amino
109-61-5 Propyl chloroformate
129-00-0 Pyrene
91-22-5 Quinoline
106-51-4 Quinone
82-68-8 Quintozene [pentachloronitrobenzene]
78-48-8 S,S,S-tributyltrithiophosphate (DEF)
81-07-2 Saccharin (manufacturing, no supplier notification)
94-59-7 Safrole
7440-22-4 Silver
7631-89-2 Sodium arsenate
7784-46-5 Sodium arsenite, solid
124-65-2 Sodium cacodylate
128-04-1 Sodium dimethyldithiocarbamate
13410-01-0 Sodium selenate
10102-18-8 Sodium selenite
10102-20-2 Sodium tellurite

57-24-9 Strychnine
505-60-2 Sulfur mustard (mustard gas H)
77-81-6 Tabun
79-94-7 Tetrabromobisphenol A
630-20-6 1,1,1,2-Tetrachloroethane
79-34-5 1,1,2,2-Tetrachloroethane
64-75-5 Tetracycline hydrochloride
78-00-2 Tetraethyl lead
3689-24-5 Tetraethyldithiopyrophosphate
597-64-8 Tetraethyltin
119-64-2 Tetrahydronaphthalene
75-74-1 Tetramethyllead
7440-28-0 Thallium
6533-73-9 Thallous carbonate
62-55-5 Thioacetamide
59669-26-0 Thiodicarb
62-56-6 Thiourea
614-78-8 Thiourea, (2-methylphenyl)-
137-26-8 Thiram
1314-20-1 Thorium dioxide
95-53-4 o-Toluidine
8001-35-2 Toxaphene
68-76-8 Triaziquone [2, 5-cyclohexadiene-1, 4-dione, 2, 3, 5-tris(1-aziridiny)-]
24017-47-8 Triazofos
1983-10-4 Tributyltin fluoride
52-68-6 Trichlorfon [phosphonic acid, (2, 2, 2-trichloro-1-hydroxyethyl)-, dimethyl ester]
1558-25-4 Trichloro(chloromethyl)silane
71-55-6 1,1,1-Trichloroethane (methyl chloroform)
120-82-1 1,2,4-Trichlorobenzene
79-00-5 1,1,2-Trichloroethane
75-69-4 Trichlorofluoromethane (CFC-11)
327-98-0 Trichloronate
88-06-2 2,4,6-Trichlorophenol
96-18-4 1,2,3-Trichloropropane
88-05-1 2,4,6-Trimethyl-aniline
824-11-3 Trimethylolpropane phosphite
76-87-9 Triphenyltin hydroxide
51-79-6 Urethane (ethyl carbamate)
1314-62-1 Vanadium pentoxide
81-81-2 Warfarin
129-06-6 Warfarin sodium
87-62-7 2,6-Xylidine
28347-13-9 Xylylene dichloride
Storage Group J: Poison Compressed Gases
Identifier Name
116-15-4 Hexafluoropropylene
7446-09-5 Sulfur dioxide

Storage Group K: Compatible Explosives Or Other Highly Unstable Materials

Identifier Name

556-88-7 Nitroguanidine

88-89-1 Picric acid, dry (<10% water)

288-94-8 Tetrazole

124-47-0 Urea nitrate

Storage Group L: Non-Reactive Flammable And Combustible, Including Solvents

Identifier Name

75-05-8 Acetonitrile

98-86-2 Acetophenone

107-13-1 Acrylonitrile, inhibited

557-40-4 Allyl ether

71-43-2 Benzene

103-50-4 Benzyl ether

110-47-4 Beta-isopropoxypropionitrile

106-99-0 Butadiene

78-92-2 2-Butanol

71-36-3 n-Butanol

75-65-0 tert-Butanol

78-93-3 2-Butanone (MEK)

141-32-2 Butyl acrylate

8001-58-9 Creosote

110-82-7 Cyclohexane

108-93-0 Cyclohexanol

110-83-8 Cyclohexene

931-87-3 Cyclooctene

142-29-0 Cyclopentene

91-17-8 Decahydronaphthalene

75-43-4 Dichlorofluoromethane (HCFC-21)

77-73-6 Dicyclopentadiene

462-95-3 Diethoxymethane

111-96-6 Diethylene glycol dimethyl ether

109-87-5 Dimethoxymethane

124-40-3 Dimethylamine

68-12-2 N,N-Dimethylformamide

99-98-9 Dimethyl-p-phenylenediamine

51-28-5 2,4-Dinitrophenol

123-91-1 Dioxane

821-08-9 Divinyl acetylene

110-80-5 2-Ethoxyethanol

140-88-5 Ethyl acrylate

75-00-3 Ethyl chloride

107-12-0 Ethyl cyanide

60-29-7 Ethyl ether

100-41-4 Ethylbenzene

74-85-1 Ethylene

110-71-4 Ethylene glycol dimethyl ether

75-34-3 Ethylidene dichloride
115-21-9 Ethyltrichlorosilane
110-00-9 Furan
78-82-0 Isobutyronitrile
98-82-8 Isopropyl benzene
108-20-3 Isopropyl ether
126-98-7 Methacrylonitrile
67-56-1 Methanol
109-86-4 2-Methoxyethanol
74-99-7 Methyl acetylene
96-33-3 Methyl acrylate
67-56-1 Methanol
96-37-7 Methyl cyclopentane
108-10-1 Methylisobutyl ketone (MIBK)
80-62-6 Methyl methacrylate
109-06-8 2-Methylpyridine
872-50-4 N-Methyl-2-pyrrolidone
1634-04-4 Methyl tert-butyl ether
91-20-3 Naphthalene
1122-60-7 Nitrocyclohexane
79-46-9 2-Nitropropane
67-63-0 2-Propanol
107-19-7 Propargyl alcohol
123-38-6 Propionaldehyde
110-86-1 Pyridine
100-42-5 Styrene
109-99-9 Tetrahydrofuran
108-88-3 Toluene
7440-62-2 Vanadium (except when contained in an alloy)
108-05-4 Vinyl acetate
109-93-3 Vinyl ether
1330-20-7 Xylene (mixed isomers)
95-47-6 o-Xylene
106-42-3 p-Xylene
Storage Group X: Incompatible With All Other Storage Groups
Identifier Name
107-02-8 Acrolein
107-18-6 Allyl alcohol
107-05-1 Allyl chloride
107-11-9 Allylamine
7429-90-5 Aluminum
62-53-3 Aniline
622-79-7 Benzyl azide
7726-95-6 Bromine
109-72-8 Butyllithium
107-07-3 Chloroethanol
76-06-2 Chloropicrin

104-12-1 p-Chlorophenyl isocyanate
10210-68-1 Cobalt carbonyl
334-88-3 Diazomethane
78-88-6 2,3-Dichloropropene
64-67-5 Diethyl sulfate
75-78-5 Dimethyldichlorosilane
57-14-7 1,1-Dimethylhydrazine
99-65-0 m-Dinitrobenzene
121-14-2 2,4-Dinitrotoluene
606-20-2 2,6-Dinitrotoluene
25321-14-6 Dinitrotoluene (mixed isomers)
106-89-8 Epichlorohydrin
151-56-4 Ethyleneimine
302-01-2 Hydrazine
74-90-8 Hydrogen cyanide
7664-39-3 Hydrogen fluoride
13463-40-6 Iron, pentacarbonyl-
556-61-6 Isothiocyanatomethane
79-22-1 Methyl chloroformate
624-83-9 Methyl isocyanate
75-86-5 2-Methylactonitrile
74-93-1 Methyl mercaptan
78-94-4 Methyl vinyl ketone
74-95-3 Methylene bromide
101-68-8 Methylenebis(phenylisocyanate) (MDI)
98-95-3 Nitrobenzene
7601-90-3 Perchloric acid
98-13-5 Phenyltrichlorosilane
7723-14-0 Phosphorus
10025-87-3 Phosphorus oxychloride
10026-13-8 Phosphorus pentachloride
7719-12-2 Phosphorus trichloride
85-44-9 Phthalic anhydride
88-89-1 Picric acid, moist (10-40% water)
151-50-8 Potassium cyanide
57-57-8 β -Propiolactone
7723-14-0 Red phosphorus
26628-22-8 Sodium azide
64568-18-9 Sodium hydrogen sulfide
60-41-3 Strychnine, sulfate
7446-11-9 Sulfur trioxide
584-84-9 Toluene-2,4-diisocyanate
91-08-7 Toluene-2,6-diisocyanate
26471-62-5 Toluenediisocyanate (mixed isomers)
79-01-6 Trichloroethylene

Chemical Control Banding Methodology

The following table can be used to determine, in general terms, the hazard controls that are needed based on general laboratory operations. To use the following table, work across the 'Conceptual Hazard Level' and 'Chemicals Used' rows to match the chemicals, processes or hazards present in the lab space, then go down the column to identify the various safety measures appropriate for this Chemical Safety Level.

DESCRIPTOR OR CONTROL	CHEMICAL SAFETY LEVEL 1	CHEMICAL SAFETY LEVEL 2	CHEMICAL SAFETY LEVEL 3	CHEMICAL SAFETY LEVEL 4
CONCEPTUAL HAZARD LEVEL	Laboratory hazards equivalent to typical household use of chemicals	Laboratory hazards equivalent to academic lab settings (restricted hazardous chemical inventory; well-established procedures in place)	Moderate or varying laboratory hazards within a narrow range (open hazardous chemical inventory; evolving procedures)	Novel hazards or severe established hazards (high hazard chemicals or processes without well-established procedures)
CHEMICALS USED	Consumer products in consumer packaging; may receive but not open chemical packages	Low concentration acids/bases, lower alcohols, solid salts, simple asphyxiant compressed gases	Typical chemical inventory for a research lab, such as flammable solvents, corrosives, inorganic salts, toxics, flammable gases. Limited amounts (mg quantities) of air or water reactive, pyrophoric materials	Air/water reactive, pyrophoric materials or gases. Explosives or potentially explosive compounds, highly toxic materials (in any state of matter)
TRAINING REQUIREMENTS (prerequisite for people working in the lab)	Observe label and warning signs	General lab safety training in addition to warning labels and signs	Laboratory hazards require laboratory-specific safety training	Laboratory access restricted to people accompanied by experienced personnel
SUPERVISION REQUIREMENTS (safety responsibilities for lab leader(s); based on highest active lab hazard or process)	Awareness of work being conducted	Constant supervision or working alone based on specific restrictions	Peer presence or working alone based on specific restrictions	Peer presence (no working alone)

OVERSIGHT REQUIREMENTS	¹ Weekly self-inspections; ² self-audits three times per year	¹ Weekly self-inspections; ² self-audits three times per year	¹ Weekly self-inspections; ² self-audits three times per year; ³ monthly drop byes; ⁴ risk-based institutional review schedule	¹ Daily self-inspections; ² self-audits three times per year; ³ monthly drop byes; ⁴ risk-based institutional review schedule
PLANNING REQUIREMENTS (based on highest rated chemical involved)	Process-specific plans written and the presence of other chemicals prohibited	Written procedures including safety protocols	Written procedures including safety protocols must be peer reviewed	Written procedures including safety protocols approved by supervisor
GENERAL PPE REQUIREMENTS (EYE AND SKIN EXPOSURE)	Coverage of legs and feet; other PPE as determined by PPE hazard assessment	CL1 PPE plus eye protection	CL2 PPE plus lab coat	CSL3 plus flame resistant lab coat
SPECIFIC PPE REQUIREMENTS (HAND AND RESPIRATORY PROTECTION) (Process specific)	No gloves or gloves as recommended in the manufacturers' instructions	Activity-specific gloves, such as nitrile, vinyl or latex disposable gloves would be typical	Activity-specific gloves, such as nitrile, vinyl or latex disposable gloves would be acceptable for an incidental small quantity splash. Neoprene or butyl rubber may be needed for immersion in solvents, or similar situations	Activity-specific gloves, such as flame resistant if using pyrophoric liquids, neoprene if using large quantities

DESCRIPTOR OR CONTROL	CHEMICAL SAFETY LEVEL 1	CHEMICAL SAFETY LEVEL 2	CHEMICAL SAFETY LEVEL 3	CHEMICAL SAFETY LEVEL 4
GENERAL VENTILATION REQUIREMENTS/ ENGINEERING CONTROLS	None or low ventilation specifications	Moderate ventilation/ local exhaust ventilation (snorkels) or other source control	Fume hoods, local exhaust ventilation (snorkels), limited glove box use	Fume hood, local exhaust ventilation (snorkels), glove/box, enclosed reactor
EMERGENCY RESPONSE PROTOCOLS	Institutional-specific response protocols	Institutional-specific response protocols; people with knowledge of incident have responsibility to provide information to responders; trained personnel can contain and remediate small spills	Institutional-specific response protocols; may have advanced lab response protocol to make the situation safe while evacuating	Institutional-specific response protocols; specific pre-planning is required

- ¹ Self-inspection: quick review of physical surroundings; may or may not use a formal checklist
- ² Self-audit: more comprehensive review of the CSL and other documentations; uses a checklist
- ³ Drop by: informal review, consult, check-in by institutional representative
- ⁴ Risk-based institutional review: formal review by lab by an institutional representative; uses a checklist, document issues for correction, escalate issues to upper management as necessary

Chemical Control Banding

Methodology 2

The following tables can be used to evaluate the hazards and hazard controls for chemicals. The first table is used to determine the chemical safety level (CSL) based on the physical characteristics of the chemical. This information can be found on the Safety Data Sheet. The second table is used to determine the general protection guidelines for the chemicals. Note that this methodology is not appropriate for addressing hazards that may arise from *processes* or *equipment*, such as use of pressure vessels, hot plates, ovens, compressed gas cylinders, etc.

Hazard	General Description of Hazards	Fire	Reactivity	Acute Toxicity	Chronic Toxicity
CSL 1	Laboratory hazards equivalent to typical household use of chemicals	Flashpoint above 140 F	No chemical changes expected in the process	All chemicals have no or low toxicity and occupational exposure limits (OEL) > 500 ppm; not an irritant or sensitizer	None known
CSL 2	Laboratory hazards equivalent to academic lab settings (restricted hazardous chemical inventory; well-established procedures in place)	Flashpoint above ambient (73 F), expected concentration <10% of the lower explosive limit	No known incompatibilities between chemicals being used	All chemicals have known toxicities and 10 ppm < OEL < 500 ppm	Specific target organs or irreversible effects suspected

CSL 3	Moderate or varying laboratory hazards within a narrow range (open hazardous chemical inventory; evolving procedures)	Flashpoint at or below ambient. Expected concentration >10% of the lower explosive limit	Chemicals with known reactions or contamination hazards present	Unknown toxicities or OEL < 10 ppm; severely irritating or corrosive; sensitizers	Specific target organs or irreversible effects probable
CSL 4	Novel hazards or severe established hazards (high hazard chemicals or processes without well-established procedures)	Pyrophorics, air or water reactives, etc.	High hazard reactions in use; potential deflagration or detonation hazard	OEL < 1 ppm; very toxic on single exposure; reproductive hazard; carcinogens	Irreversible toxicities require use of designated areas

	Facility	Training	Oversight	PPE	Response Protocol
CSL 1	Any room, general ventilation	Read the label or manufacturer's instructions	Generic self-inspection guidelines	Covered legs and feet; other PPE as determined by PPE hazard assessment	No unusual hazmat concerns
CSL 2	Ventilated lab room; local exhaust (snorkels) for source control	General lab safety training in addition to training on warning signs and labels and lab safety protocols	Constant supervision or working alone based on specific restrictions	Activity-specific gloves, such as nitrile, vinyl or latex disposable gloves would be typical, eye protection, other PPE as determined by PPE hazard assessment	Respond as to general alarm; people with knowledge of incident have responsibility to provide information to responders; trained personnel can contain and remediate small spills

CSL 3	Lab room with exhaust ventilation (fume hood, glove boxes, etc.)	CSL 2 lab-specific safety training. Generic training for unexpected events.	Process training and external audits	Activity-specific gloves, such as nitrile, vinyl or latex disposable gloves would be typical, eye protection, other PPE as determined by PPE hazard assessment	Institutional-specific response protocols; may have advanced lab response protocol to make the situation safe while evacuating
CSL 4	Specifically designed lab	CSL3 plus practice before working with live materials	CSL3 plus written standard operating procedures and specific oversight processes	CSL3 plus process-specific PPE	CSL3 plus specific pre-planning is required; coordination with first responder

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