



UNIVERSITY OF
ILLINOIS
URBANA - CHAMPAIGN

Institute for Genomic Biology

Safety Manual

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Approved by the IGB Safety Committee 05-13-200

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I. INTRODUCTION TO SAFETY **AT THE IGB**

This manual is designed to acquaint existing and incoming IGB personnel with the safety infrastructure and major safety policies and operating procedures of the IGB. The interdisciplinary work and open lab environment of the IGB can create complex safety issues, and it is important that IGB personnel be aware of and abide by policies and procedures directed towards the needs of that environment as well as general safety policies and procedures. A large body of additional information, guidance

and general safety and operating procedures are available on the Safety page of the IGB Web site. Included are an online version of this document as well as the IGB Chemical Hygiene Plan.

The purpose and intent of IGB Safety and Compliance, served by the Associate Director of Operations and Facilities for the IGB, is to provide a safe environment for researchers, support staff, students and visitors, encourage and enable the development of a safety culture within the Institute and enhance the Institute's public image, while minimizing disruption to research activities. IGB Safety and

Compliance, which is a part of the IGB Operations and Facilities Office, develops and administers comprehensive safety and compliance programs, which in concert with other campus safety units and in partnership with the IGB research community, assures compliance with regulatory requirements. Additionally, IGB Safety and Compliance interfaces with outside agencies as is required and appropriate, provides teaching and training programs for personnel using IGB facilities, maintains safety equipment and supplies and a collection of safety resource materials, and coordinates other safety and compliance-related functions within the IGB.

II. EMERGENCY SAFETY **CONTACT INFORMATION**

Emergency

(fire, police or ambulance, major spills)

9-911 from a campus phone

911 from a cell phone

Maintenance / Repair off-hour Service

(Facilities and Services)

333-0340

IGB Safety and Compliance

(Robert Mann)

bobmann@igb.illinois.edu

Office phone 244-8346

Cell 493-9651

Facilities and Services Division of Safety and Compliance

(spills outside of buildings)

265-9828

MTD SafeRides

(transportation for individuals)

265-7433

When an emergency arises outside of normal business hours, inform any faculty member directly involved in the space where the emergency occurred or one or more

of the following persons after making the appropriate emergency calls indicated above:

Robert Mann

Occupational Safety Coordinator

Home phone 446-7990

Cell phone 493-9651

Tim Kerestes

Director, Operations and Facilities

Home phone 355-8460

Cell phone 649-8967



III. NON-EMERGENCY SAFETY

CONTACT INFORMATION

IGB Safety and Compliance

(Robert Mann)

bobmann@igb.illinois.edu

Office phone 244-8346

Cell 493-9651

Non-Emergency Police

Department

333-8911

Campus Non-Emergency Fire

Service

333-9711

Urbana Fire Department,

Gregory Drive Substation

333-3985

*For other safety contact information,
see the Safety page of the IGB Web
site at*

[http://www.igb.uiuc.edu/facilities&
services/safety_compliance.html](http://www.igb.uiuc.edu/facilities&services/safety_compliance.html).

IV. IGB-SPECIFIC SAFETY POLICIES AND PROCEDURES

Safety Organization at the IGB

Primary safety responsibility at the IGB lies with the Director of the IGB. The Associate Director of Operations and Facilities for the IGB coordinates the safety and compliance program within the IGB and serves as the liaison to campus safety units, campus safety committees and outside city and regulatory agencies. The IGB Safety Committee, comprised of faculty and other IGB and EBI personnel, and the theme safety coordinators from individual themes, the EBI and the Core Facilities have responsibilities as outlined in each of those documents in the appendices. IGB Faculty share in responsibilities as are outlined in the Office of the Vice Chancellor for Research (VCR) document “Responsible Conduct of Research” and the Campus Administrative Manual (CAM) document “EH&S Responsibilities of Supervisors”, a copy each of which is in the

appendices. Each individual researcher has responsibility for safety in areas where the researcher works as is outlined in the CAM document “EH&S Responsibilities for Employees” in the appendices.



Safety Requirements for New Employees and Students

All new employees and students working in IGB laboratories are required to complete safety training intended to familiarize them with IGB emergency and safety and security policies appropriate to their work. Prior to receiving keys and/or card access to IGB space,

researchers and others working in laboratories are required to take both the General Online Laboratory Safety Training provided by DRS and the IGB Online Safety Training appropriate for the work they will be doing, and to pass the corresponding IGB safety exam. The training is intended to familiarize them with the IGB space and safety policies and procedures corresponding to their work and provide a portion of initial training required for their work.

Ongoing Training for Continuing Employees and Students

Regulatory and funding agencies require ongoing (e.g. annual) safety training depending on activities that employees and students are involved in. A list of campus training opportunities is maintained on the Safety page of the IGB Web site.

Safety Checkout when Leaving the IGB

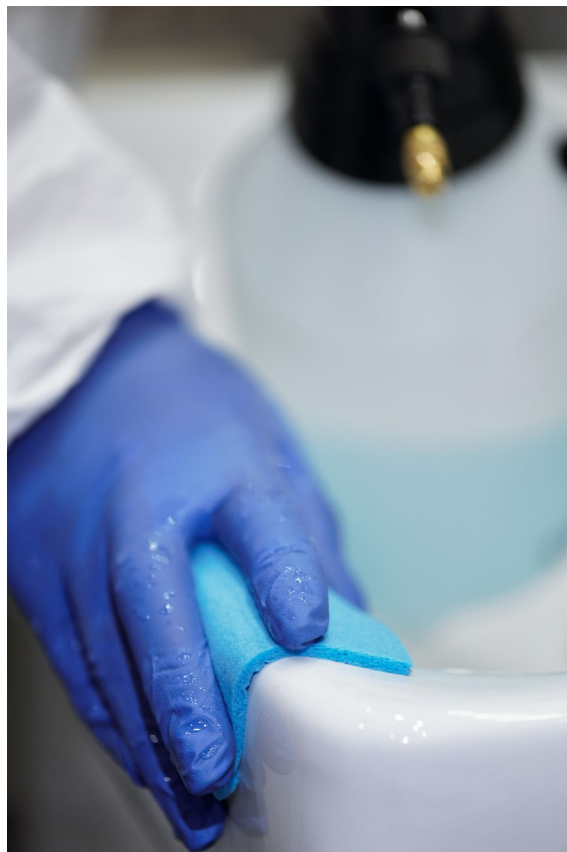
All researchers must go through a check-out process upon leaving IGB space. For researchers within a research group that is staying in the space, the theme safety coordinator for that group is responsible for the checkout of the researcher who is leaving. If research groups are leaving the IGB, arrangement for checkout should be made through John Pingel. A copy of the IGB Closeout Checklist is in the appendices. Some items on the checklist may not be applicable to everyone.

Personal Protective Equipment (PPE) and Personal Hygiene

PPE, which is required by the IGB and provided by the Themes, along with personal hygiene are basic aspects of laboratory safety.

Wearing appropriate personal protective equipment and practicing good personal hygiene as described below will minimize exposures to hazardous materials during routine use and in the event of an accident.

Eating, Drinking, the Storage of Food for Human Consumption and the Application of Cosmetics are not allowed in IGB laboratories, including the desk areas within the theme labs. Human food storage must be separate from lab chemical, lab biological or radioactive material storage. Food for human consumption should also not be



Hand Washing:

Hands should be washed frequently throughout the day, after glove removal, before leaving the lab, after contact with any hazardous material, and before eating, drinking, smoking, or applying cosmetics.

Attire:

Wear a lab coat or apron, cover legs (no shorts or skirts) and feet (no sandals or open-toed shoes), confine loose clothing and long hair. Nylons and/or pantyhose are not recommended because they may melt upon contact with acid, trapping the acid against the skin.

Eye Protection:

It is state law and campus policy that personnel including students, staff and visitors in laboratories wear safety glasses, goggles, or face shields at all times where eye hazards are a possibility. Chemical splash goggles are recommended when chemical splashes are possible.

Contact Lenses:

Contact lenses may be worn in the IGB laboratories; however, they do not provide any protection for the eyes. Persons who wear contacts must wear the same eye protective equipment as persons who do not wear contacts. It is advisable for a person wearing contacts to inform co-workers and advisors of the

contacts, so that if there is an emergency situation involving chemicals and the eyes, potential emergency responders will know to remove the contacts.

Face Shields:

Full-face shields must be worn when conducting a procedure which may result in a violent reaction.

Gloves:

Gloves are essential when working with hazardous substances. The proper gloves will prevent skin absorption, infection or burns without significantly affecting dexterity. Poor dexterity could increase the risk of chemical spills. Glove materials vary in effectiveness in protecting against chemical hazards, and gloves of the same material may differ in the time it takes for a chemical or solvent to pass through the gloves and in the volume of material that easily passes through the gloves. Consult a chemical resistance chart, ideally from the specific glove manufacturer, or contact John

Pingel for assistance in appropriate glove selection.



Respiratory Protection:

Administrative controls (different materials or procedures) and engineering controls (chemical fume hoods, biological safety cabinets and other ventilation strategies) are always preferable to protection by PPE. Work in a chemical fume hood when working with materials that produce hazardous vapors or fumes. If the use of a respirator is required for work that can not be performed in a chemical fume hood, compliance with the UIUC Respiratory Protection Program, administered by the F&S Division of Safety and Compliance, is required. The Respiratory Protection Program includes requirements for a medical assessment, fit testing and instructions on proper use of respirators.



Transportation of Chemical, Biological and Radiological Materials

Inside the IGB:

Transportation of chemicals, solvents and other potentially hazardous materials must incorporate secondary containment to minimize the chance of accidental release of material. Rubber bottle carriers for 4-liter bottles, or lab carts with sealed shelving are examples of appropriate secondary containment. If an elevator is used to transport a Dewar containing a cryogen, the Dewar must be maintained in a manner that assures that the Dewar will not tip over, which could cause possible asphyxiation conditions within the

elevator and adjoining spaces.

Passengers should not accompany Dewars of cryogens, as if the elevator malfunctions, oxygen could be displaced in the elevator compartment.

Transportation to and from the IGB:

Chemical, biological and radiological materials should not be brought into the IGB without specific knowledge of a PI and must be contained appropriately for the transportation of the particular material. Personal insurance companies are known to cancel insurance on people found carrying laboratory chemicals in personal vehicles. If transported in vehicles, the vehicles must be appropriate for carrying the materials.

Open Lab Issues

In the open lab environment, many people can be easily impacted by one individual's unsafe practices. Control of potentially hazardous materials needs to be carefully overseen by everyone in the labs.

Radioactive, Biological and Highly Toxic Material Security:

While the intent of biosafety is to protect people from dangerous pathogens, the intent of biosecurity is to protect pathogens from dangerous people. Potentially hazardous radioactive and chemical materials also need to be secured from people who should not have access to them. Regulations for many such materials require that the materials be kept under lock and key. The IGB is designed to accommodate the security needed, but every individual in every lab needs to assist in assuring that spaces that need to be secure remain locked, without doors being propped open, and that no one who is not authorized to be in the labs is allowed in the labs.

General Use of Shared Space:

Shared lab space inherently has the perception of no one researcher having responsibility for areas within the space. In order to maintain a safe environment, all researchers need to maintain an acute

awareness of how they can help to maintain an environment that is safe for everyone. Likewise, while one group may be doing lab work, another group may be in a visiting, and the later group may not be thinking about others doing lab work. It is important to keep in mind, and assume that at any time others in the lab may be working with potentially hazardous materials.

Chemical Control:

It is important that researchers take personal responsibility in the storage, disposal and use of chemicals. Chemical inventories should not be allowed to build up beyond needed volumes. Be careful when purchasing chemicals to only purchase what you know will be used, as money saved by purchasing materials in larger quantities is quickly surpassed in disposal costs, and larger quantities can often mean larger hazards.

Biosafety Level Work:

In theme laboratories where biosafety level 2 work is being performed, the entire lab where the BL-2 work is taking place is seen as a BL-2 lab, and everyone who may be working in the lab needs biosafety level 2 awareness training provided by the theme.

Unattended Operations:

If operations need to be unattended, a system of controls for the operation must be in place to keep potentially hazardous materials in proper containment in the event of malfunction of equipment, accidental disruption by building maintenance personnel, interruptions in electric service, cooling water or inert gases and other unexpected situations; e.g., for unattended water use, an appropriate combination that may include a water pressure regulator, properly rated tubing, hose clips, locking quick disconnects and a thermocoupled heating control, spill detector or flow detector that shuts off power to equipment if cooling

water flow stops must be used. If in doubt of what is required to make an unattended situation safe, talk to John Pingel.

Emergency Equipment and Supplies are generally provided by the IGB with assistance in maintaining the supplies provided by the theme safety coordinators.

Safety Showers and Eyewashes:

The IGB provides safety showers in laboratory areas and eyewashes at every hand washing sink in the labs. The IGB will see that the emergency showers are flushed according to campus standards. The theme safety coordinators are responsible to see that eyewashes are flushed weekly.

First Aid Kits, Emergency Spill Kits and Water Cleanup Shop Vacs:

The IGB provides first aid kits, spill kits and clean water cleanup shop vacs in theme labs and other specific areas of the IGB. Theme safety coordinators are responsible for assisting in keeping the kits in the

theme spaces stocked and the water shop vacs maintained. The shop vacs have motors in them that can produce sparks and should never be used in a situation where flammable materials, flammable solvents or flammable vapors or gases could be drawn into them.

Fire Extinguishers:

The IGB provides fire extinguishers and sees that the extinguishers are inspected by the campus. Theme safety coordinators are responsible for reporting extinguisher use to IGB Safety.

First Aid Classes and CPR Classes

First aid and CPR classes are made available to the campus community through the Illini EMS (student organization) at a minimal cost. The IGB will pay for first aid and CPR classes for theme safety coordinators who would like to receive the training.



IGB Personnel Assisting in Emergencies

Anyone with appropriate training in emergency response may assist in what they are trained to do, however any such assistance is voluntary. No one at the IGB is required to provide emergency assistance as a condition of employment.

Children and Unauthorized Persons

Children and other unauthorized persons should not be in laboratories where hazardous materials or hazardous equipment are being used.

Working Alone

When working with hazardous materials, it is advisable to have a second person present, within yelling distance, or at a minimum, maintain contact via telephone. Special protection and consideration is required for work with high energy materials, high pressures, some types of work with electrical systems, transfer of flammable liquids, except in very small quantity, work with quick-acting, highly toxic materials and experimental research or laboratory procedures where previous experience has shown the desirability of having assistance available.

Refrigerator/Freezer/Constant Temperature Room Storage and Labeling:

These units should be labeled and used according to the following:

(Human) Food Refrigerator/Freezer

This unit is for food storage only. Do not store laboratory chemicals in this unit. Do not store flammable liquids/materials in this unit; it has not been explosion protected.

Laboratory Refrigerator/Freezer/Cold Room/Warm Room

Do not store food in this unit. Do not store flammable liquids/materials in this unit; it has not been explosion protected.

Flammables Refrigerator/Freezer

Do not store food in this unit. The interior, but not the exterior of this unit has been explosion protected; do not use this unit in a space where the exterior of the unit would need to be explosion protected; i.e., a potentially explosive atmosphere.

Explosion-proof Refrigerator/Freezer

Do not store food in this unit. This unit may be used to store flammable liquids/materials and may be used in

an area where exterior explosion protection is required.

Constant Temperature Rooms

Do not store food or flammable liquids/materials in this unit. Do not store anything in this unit that could cause an unsafe breathing environment.



Chemical Odor Control from Drains

Laboratory drains are a common source of chemical odors in labs, when the water in the drain trap evaporates and the negative pressure within the lab relative to the drainage system draws air and chemical vapors backwards through the drainage system into the lab. To avoid this condition, run a small amount (a liter is usually sufficient) of water into normally unused drains at month intervals.

Headphone/earphone and Cell Phone Use in Labs

Headphones/earphones and cell phones should be used with careful discretion. Headphones/earphones can make it difficult to hear important warning sounds of machinery or other researchers, and users of cell phones can easily become distracted from their work.

Perchloric Acid Use

If perchloric acid is heated above ambient temperature it may evaporate and condense on ductwork in the form of explosive perchlorates. Hence, when heating perchloric acid above ambient temperature, a perchloric acid chemical fume hood with a water wash down system or a local scrubbing or trapping system must be used.

Safety Reference Material Availability

All faculty and theme safety coordinators receive a copy of the ACS booklet Safety in Academic Chemistry Laboratories Vol.1, "Accident Prevention for College and University Students" and a copy of Safety in Academic Chemistry Laboratories Vol.2, "Accident Prevention for Faculty and Administrators". Theme safety coordinators maintain theme safety libraries of materials, which include hard copies of Prudent Practices in the Laboratory and Biosafety in

Microbiological and Biomedical Laboratories (BMBL), hard copies of the IGB Safety Manual, the IGB Chemical Hygiene Plan and protocols and SOPs that are specific to the theme. Many additional useful references are in a safety library maintained by John Pingel in room 1630 IGB. All the listed references above are also available for reading, and some for download in PDF format on the Web, and linked to from the Safety page of the IGB Web site. Many other references, such as Material Safety Data Sheets are also available through the Safety page of the IGB Web site.

V. IGB EMERGENCIES

General Procedures:

For any serious emergency where outside emergency assistance is needed, to get the fastest response, first pull the fire alarm pull station lever, which alerts the campus fire substation and starts a response, then call 9-911 from a campus phone or 911 from a cell phone. Dialing 911 from a campus phone will reach an emergency operator, but it is slower because of a delay put into the system so that a slowly-dialed international call is not mistaken for an emergency call. If a chemical is involved with the injury, hospitals and perhaps emergency responders, will want a copy of the Material Safety Data Sheet (MSDS) for the chemical used. Hospitals usually require the MSDS from the specific manufacturer. If possible, always have someone meet the emergency responders outside to provide information to them and take them to the location of the emergency.

Emergency Calls – who will respond:

If pulling a fire alarm pull station lever alone or if calling 9-911 / 911 to report a fire or large (HAZMAT) spill, four fire apparatuses and a command vehicle will respond. For a 9-911 / 911 medical call, one fire apparatus and one ambulance will respond. For a chemical incident (that is, once it has been determined that it is not a large, dangerous spill), one fire apparatus and a command officer will respond.

Emergency Medical – Minor Emergency:

First aid kits are available in the labs. If injured when work applies towards a degree, go to McKinley Health Center (non-life-threatening) or (Provena Covenant or Carle) hospital emergency room. If injured when work is not degree-related, go to Christie (7am-6pm M-F) or Carle (8am-5pm M-F) Occupational Medicine Department (non-life-threatening) or (Provena Covenant or Carle) hospital emergency room.

Inform the supervisor and fill out an incident report form.

Emergency Medical – Major Emergency:

Pull a fire alarm pull station lever and call 9-911 / 911 to get emergency medical assistance. If possible, have someone meet the emergency responders outside. Voluntary medical assistance may be provided prior to emergency responders' arrival by trained personnel. Inform the supervisor as soon as possible and fill out an incident report form.

Chemical Spills to the Body:

If the spill is major, such that the spill cannot be rinsed off in a sink, use the closest emergency shower in the lab to flush off the chemical. Remove clothing that had chemical contact. **DO NOT HESITATE TO USE EMERGENCY SHOWERS** - there may be a water cleanup afterwards, but the safety of the individual is much

more important! Rinse any spills for 15 minutes with a flow of water. The water is warmed so that extended showering can take place without discomfort. If a safety shower is used, call 9-911 / 911 for additional medical assistance, and if possible, have someone meet the emergency responders outside. Inform the supervisor as soon as possible and fill out an incident report form.

Chemical Spills to the Eye:

Flush the face and eyes with the nearest plumbed emergency eyewash for 15 minutes. Hold the eyes open with fingers or get assistance to hold the eyes open. **DO NOT HESITATE TO USE EMERGENCY EYEWASHES!** The water is warmed so that extended rinsing can take place without discomfort. Call 9-911 / 911 for additional medical assistance. If possible, have someone meet the emergency responders outside. Inform the supervisor as soon as possible and fill out an incident report form.

Hydrofluoric Acid Spills to the Body:

Get immediate attention. HF differs from other acids because the fluoride ion readily penetrates the skin, causing destruction of deep tissue layers, including bone. Pain associated with exposure to solutions of 1-50% may be delayed. If HF is not rapidly neutralized and the fluoride ion bound, tissue destruction may continue for days and result in limb loss or death. HF is similar to other acids in that the initial extent of a burn depends on the concentration, the temperature, and the duration of contact with the acid.

Chemical Spills – General:

Simple spills can be cleaned up with the chemical spill kits provided in the labs, following the directions that are in the spill kits.

Complicated spills require assistance from the fire department. If building evacuation is necessary, or if you are unsure if it is, pull the fire alarm pull station lever to

evacuate the building and then call 9-911 / 911 to describe the nature of the spill.

Defining and Classifying a Chemical Spill for Cleanup:

A spill is complicated if a person is injured, identity of the chemical is unknown, multiple chemicals are involved, the chemical is highly toxic, flammable or reactive, the spill occurs in a “public space” such as corridor, the spill has the potential to spread to other parts of the building, the clean-up procedures are not known or appropriate materials are not readily available, or the spill may endanger the environment such as reaching waterways or outside ground. If none of these criteria are met, the spill is defined as a simple spill.

Mercury Spills:

For small mercury spills that are in a controlled space, use the Hg Absorb provided in the lab spill kits,

following directions on the containers. For larger spills, contact John Pingel or contact DRS at 333-2755. If the mercury is in a heated location such as an oven, where mercury vapor would be rapidly generated, evacuate the lab until assistance arrives and determines that conditions are safe.



Fires and Fire Extinguishers:

In case of a fire, remember the word

RACE

Rescue the people in the immediate area who are most endangered.

Alert the fire department. Activate the fire alarm. Call 9-911 from a campus phone or 911 from a cell phone.

Confine the fire to as small an area as possible by closing the doors.

Extinguish: decide quickly if you can extinguish the fire. If you can safely put out the fire, do so.

If you attempt to fight a fire, make sure that you have an exit to your back, and don't forget the word **PASS**

Pull the safety pin,

Aim the nozzle or hose,

Squeeze or press the handle, and

S

weep the agent across the base of the fire.

If you can not safely extinguish the fire, get out, closing all doors between you and the fire.

Meet the fire department.



Use of Emergency Shutoffs

Familiarize yourself with location and use of emergency shutoffs prior to needing to use them. Power should be shut off for the lab, if safe to do so, in the event of a flammable liquid spill or flammable gas leak where a fire could start from a spark source such as a vacuum pump, and whenever else it is prudent to do so.

Emergency Signage is posted in various areas of the building. Be sure to familiarize yourself with the safety information provided.

3-slot Emergency Card Holders are provided at each theme lab entrance and in other appropriate locations in the IGB. An emergency information card with contact and potential hazard information goes into the center slot, where emergency responders can easily remove the card to take it to a safe location to make calls to people listed on the card. It is important that the information on these cards be kept current. Other slots in the 3-slot holders are for biological, radiation and Laser safety cards, and for other safety notices. An example of the emergency information card is included in the appendices.

Emergency Evacuation Information and Other Safety Information is posted in various locations inside the IGB.

Use of Safety Showers and Eyewashes

Safety showers and eyewashes are activated by pulling a handle or pushing a paddle. The devices are designed to stay on until manually turned off, so that hands are free to remove clothing, hold eyes open and assist in flushing. Warm water is provided by the appliances so that extended flushing can take place comfortably. The recommended flushing time for any chemical spill to the body or eyes is 15 minutes. **DO NOT HESITATE TO USE THESE DEVICES!** It is preferable to have an extra lab coat available for people who need to remove clothing. If clothing removal is needed, it is preferable to have someone available to keep people from the area of the lab where the shower is being used.





Tornado/Weather/Earthquake Emergencies

Definitions: *Tornado Watch* - Be alert. Atmospheric conditions in the county are such that a tornado could develop. *Tornado Warning* - Prepare to take cover. A tornado has been sighted in the area. Prepare to take cover immediately if you hear the siren or are advised of this situation via other media. *Tornado Season* - The tornado season for the Champaign-Urbana area is generally from March 1 to August 1.

Tornado Response:

If notified of a *Tornado Watch*, tornado information is available on WILL AM 580 or other local stations; be aware of the possible sounding of

sirens and have laboratory equipment set up such that equipment can be left in the event of a tornado warning. If notified of a *Tornado Warning* via siren, take cover for a period of 30 minutes in the IGB tornado shelter, which is marked by signs in the east hallway area of the concourse. If the immediate danger continues to exist, the siren will be sounded again at the end of that 30-minute period, or any time after that 30 minute period that a new, immediate danger develops. *No all clear signal will be sounded.*

Weather Emergencies Other than Tornadoes:

Links to information on severe weather, such as severe thunderstorms and blizzards, can be found on the Safety page of the IGB Web site.

Earthquakes:

The IGB is built to accommodate earthquake activity for this area of

the state. Although no major activity is expected, it is always wise to plan for activity by storing potentially hazardous materials where they cannot easily fall off shelves.

Building Issues such as Steam and Water Leaks:

For steam, water and other utility issues in normal working hours (8 a.m. – 5 p.m.), contact the IGB Facilities office at facilities@igb.uiuc.edu or 333-0860.

For repairs off hours, call the campus Facilities and Services office at 333-0340.

APPENDIX A - RESPONSIBLE CONDUCT OF RESEARCH

Responsible Conduct of Research

The Office of the Vice Chancellor for Research (OVCR) provides programs and services to help you meet the ethical and regulatory requirements for the responsible conduct of research. The chart below provides information on how to meet those requirements and contact information for the units that offer support.

If you

You need to

Have a laboratory or oversee research work

- Ensure that all personnel (including yourself) have received appropriate training
- Be prepared to deal with emergencies – have a written plan and appropriate spill response materials; ensure that personnel are familiar with the plan; and maintain current information on door signs for emergency personnel
- Manage conflicts of commitment and interest that may arise
- Conduct research and publication activities according to accepted ethical standards

Conduct research or teaching activities involving animals

- Obtain approval for your animal use from the Institutional Animal Care and Use Committee (IACUC)
- Report any concerns about animal mistreatment to the OVCR, Division of Animal Research (DAR), Agricultural Animal Care and Use Program (AACUP), or IACUC
- Arrange for animal housing or consult with a veterinarian about animal procedures, anesthesia, analgesia, euthanasia, or other issues by contacting DAR or AACUP

Conduct research involving human subjects (including human biological specimens)

- Review the Institutional Review Board (IRB) Investigator Handbook
- Register your project with IRB and obtain approval or exempt determination before initiating your research
- Contact the OVCR for research involving scientific diving

Conduct research with human materials; any plant, animal, or human pathogens; transgenic plants or animals; nonhuman primate materials; biotoxins; wild mammal materials; or recombinant DNA

- Register your project with the Biological Safety Committee through the Division of Research Safety (DRS) and obtain approval before initiating your research

Work with chemicals

- Have a written Chemical Hygiene Plan (CHP) that addresses the safe use, proper storage, engineering controls, personal protective equipment, and emergency response procedures for chemicals in your laboratory
- Make sure laboratory personnel are familiar with and follow the CHP requirements and use Material Safety Data Sheets appropriately

Work with radioactive materials

- Obtain a radiation permit from DRS. The facilities, equipment, and procedures required to work safely with these materials will be addressed in the registration or permitting

Generate hazardous waste in the laboratory

- Know the options and requirements for disposal of biological, chemical and radiological waste – DRS provides **free** collection and disposal of most laboratory wastes

Receive, ship, provide for shipment, or transport hazardous material to or from off-campus locations

- Determine, *before* shipping, whether the biological material or chemical substance (e.g. dry ice) is considered a hazardous material by the Department of Transportation
- Understand that shipping or transporting hazardous materials internationally may have additional requirements
- Obtain appropriate training required for the function you perform in shipping and/or receiving of hazardous materials. Contact DRS for more information

If you	You need to
Use biological safety cabinets	<ul style="list-style-type: none"> ● Get your cabinet certified at the time of installation, annually thereafter, and at any time the unit is re-located, then send certification to DRS
Work with analytical X-ray machines or operate lasers	<ul style="list-style-type: none"> ● Register the machine with DRS and develop a written safety plan and safe operating procedures
Are going on sabbatical leave or will be absent more than 30 days	<ul style="list-style-type: none"> ● Appoint a person familiar with laboratory procedures to oversee the laboratory in your absence ● Ensure that there is a named co-investigator who has the authority to make any necessary decisions regarding animal use on any animal use protocol
Are resigning or leaving the University	<ul style="list-style-type: none"> ● Arrange for final disposal of all biological, chemical, and radiological materials ● Decontaminate all work surfaces and perform a radiation survey, if applicable ● Leave the laboratory clean for the next occupant ● Contact the IACUC to terminate any animal use protocol or amend protocol to name new investigator
Need patents, copyrights, invention disclosures, technology commercialization licenses, confidentiality agreements or agreements for transfer of materials off-campus	<ul style="list-style-type: none"> ● Contact the Office of Technology Management (OTM)
Need assistance with agreements to transfer materials into the University, non-disclosure agreements with collaborators or sponsors, research agreements involving intellectual property issues, unique research-related agreements, or information on academic research policies	<ul style="list-style-type: none"> ● Contact the Office of Research Administration (ORA) ● Forward all Material Transfer Agreements (in), Non-Disclosure Agreements (in or reciprocal), and Software License Agreements that do not require payment to the ORA for review <i>before</i> signing
Have sponsored project proposals, and need assistance with review of budgets; grants and contracts; lower-tier subawardees and consultants; technical testing agreements; research gifts/unrestricted grants; facilities and administrative (indirect) costs; or award reporting	<ul style="list-style-type: none"> ● Submit all proposals for approval by your unit and the Grants & Contracts Office (GCO) ● Submit all award documents associated with sponsored projects to GCO (excluding Intellectual Property or no dollar agreements addressed by ORA or OTM)
<div> <div> Office of the Vice Chancellor for Research 333-0034 • www.research.uiuc.edu Division of Animal Resources 333-2564 • www.dar.uiuc.edu Institutional Review Board 333-2670 • www.irb.uiuc.edu </div> <div> Institutional Animal Care and Use Committee 333-7789 • www.iacuc.uiuc.edu Division of Research Safety 333-2755 • www.drs.uiuc.edu Office of Technology Management 333-7862 • www.otm.uiuc.edu </div> <div> Agricultural Animal Care and Use Program 333-0034 • www.dar.uiuc.edu Office of Research Administration 244-2382 • www.research.uiuc.edu/ora Grants and Contracts Office 333-2187 • www.oba.uiuc.edu/gco </div> </div>	

APPENDIX B – IGB THEME SAFETY COORDINATOR RESPONSIBILITY GUIDELINES

- 1. Serve as a liaison between theme members, the IGB Safety and Compliance Coordinator and other safety contacts** for providing information and materials to theme members and bringing safety-related questions, concerns and suggestions from theme members to the attention of appropriate responsible people. As appropriate, meet with or attend meetings with other Theme Safety Coordinators and the IGB Safety and Compliance Coordinator to discuss safety information and concerns.
- 2. Maintain the theme safety information library** The library should contain the Theme Safety Binder, which should serve as the theme safety manual and theme biosafety manual. The binder should contain a copy of the IGB Safety Manual, the IGB Chemical Hygiene Plan, protocols within the theme, SOPs, and other materials such that it can be used as a safety training reference. The library should also include hard copies of Prudent Practices in the Laboratory, Biosafety in Microbiological and Biomedical Laboratories, the UIUC Chemical Waste Management Guide, the student and administrator editions of “Safety in Academic Chemistry Laboratories”, accident report forms and other safety-related references as appropriate.
- 3. Assist in the safety training program of theme members and development of the IGB safety culture** This could include providing information to theme members about what to do in the event of emergencies, showing theme members how to access Material Safety Data Sheets, how to use safety equipment. etc.
- 4. Assist the theme in preparation for and contingency planning for the safety and security aspects of emergency and non-emergency situations** such as safe and secure storage of hazardous materials, power outages (planned and unplanned) or for emergency departures from the labs in emergencies such as for tornado warnings or fire evacuations.

5. **Assist in the maintenance of lab emergency equipment and supplies** by performing or coordinating weekly flushing of eyewash stations, monitoring supplies in first aid kits and spill kits, and reporting fire extinguisher use.
6. **Where appropriate, inspect or assist in various safety inspections and audits and assist in the abatement or resolution of deficiencies or issues found in the inspections or audits.**
7. **Serve as a liaison between theme members and the Division of Research Safety (DRS)** to provide information to theme members for the proper disposal of excess chemicals and chemical waste, disposal of sharps, etc. Assist in the assurance of the segregation of chemical waste as required by DRS.
8. **Coordinate as needed the recycling program for the theme.**
9. **Provide accident report forms to theme members.**
10. **Coordinate the updating of emergency door notices.**
11. **Maintain theme location(s) for theme safety supplies**, which may include visitors' safety glasses and other safety supplies that are for the benefit of the theme rather than for individual theme members.
12. **Perform the safety checkout of research personnel within the theme that are leaving IGB space.**

APPENDIX C – IGB SAFETY COMMITTEE RESPONSIBILITY GUIDELINES

1. Consider, review and develop, as needed, policies and procedures related to IGB safety and compliance.
2. Review, as appropriate, fire and other emergency responses to the IGB and incidents and accidents occurring in IGB space.
3. Review, as required, IGB safety documents that have mandated review requirements.
4. Assist in the oversight of safety and compliance as needed within themes.
5. Make recommendations to the IGB Director and campus

Updated 3/29/07 by Pingel

APPENDIX D – MODEL CLOSEOUT PROCEDURES CHECKLIST

Hazardous Material/Procedure

Date Completed or N/A

Chemicals

If moving chemicals off campus, prepare chemicals for shipment according to DOT requirements.

Transfer ownership of chemicals to lab(s) that can use them and have agreed to take them.

Dispose of all remaining chemicals through DRS.

Clean all surfaces with strong detergent.

Controlled Substances

If transferring substances to another DEA registrant, submit appropriate forms to U.S. DEA prior to transfer.

If disposing substances, submit appropriate forms to U.S. DEA prior to and after disposal.

Conduct appropriate transfer or disposal of controlled substances.

Gas Cylinders

Return to supplier.

Contact DRS to arrange for disposal of non-returnable cylinders.

Sharps

Place in sharps disposal container.

Arrange for disposal of full containers by contacting BSS (3-2755).

Cultures, Stocks and Disposable labware

Collect and autoclave waste in an autoclavable bag; overbag with opaque trash bag; dispose in regular waste stream.

Clean incubators, ovens, refrigerators.

Hazardous Material/ProcedureDate Completed or N/A**Pathological Waste**

Dispose of tissue via incineration. Contact BSS for information

Dispose of preservative. Contact CSS (3-2755) for information.

Clean refrigerators/freezers.

Radioactive Materials

Package all radioactive materials for disposal and arrange pickup.

Transfer materials to: _____ (check with RSS at first 3-2755)

Perform contamination survey, and resurvey, if necessary.

Schedule closeout survey by RSS. Date of survey: _____

Review results of RSS survey.

Mixed Hazards

Identify mixed hazards: _____ and
contact DRS.

Equipment

Clean or decontaminate equipment to be left in place.

Contact DRS regarding disposal of equipment.

Shared Storage Areas

Check all shared storage areas for hazardous materials.

Department Sign-off

Submit completed check-list to department head for signature.

Researcher Signature _____

Date _____

Department Head Signature _____

Date _____

Laboratories Closed Out (Bldg. & Rooms) _____

APPENDIX E – IGB OFFICE SAFETY INSPECTION CHECKLIST

Housekeeping:

1. *Aisles are uncluttered.* Aisles are free of debris or materials which create a projection hazard, and in rooms with multiple desks should be maintained at or near 36" clear.
2. *Floor is free of debris which could create a slipping/tripping hazards.* The floor of the office must be maintained free of water and other materials which could create a slipping hazard. In addition, the office floor must be maintained free of cords and other materials which could create a tripping hazard.
3. *Trash cans and recycle cans are not overflowing.* All trash cans and recycle cans must be emptied on a regular basis to prevent them from overflowing and creating an unhealthy condition and/or fire hazard.
4. *Room is free of excess combustible materials.* The room must not be used for the storage of excess boxes, plastic and other combustible materials which could create an unreasonable fire hazard.

Storage:

1. *All boxes and other materials are stored in an orderly manner.* All office materials are stored in an orderly non-hazardous manner inside storage cabinets or on shelves.
2. *Shelves do not appear to be overloaded.* The shelves within the office do not appear to be overloaded, buckling and/or pulling away from the mounting surface.
3. *Stored materials do not create a hazard.* Other stored materials in the office do not create any additional hazards. Considerations include the storage of flammable and combustible liquids, materials with sharp or jagged edges, and hazardous chemicals.

Other considerations:

1. *Equipment within the office appears to be in good repair.* All of the equipment in the office appears to be in good condition. Considerations include exposed electrical conductors, broken sharp edges and exposed hazardous mechanical parts.
2. *There are no frayed electrical cords.* There are not frayed electrical cords on the office equipment or power strips being used.

3. *Power strips and extension cords are being used properly.* Power strips are in locations where they can be inspected and are not daisy-chained. Extension cords are being used only as a temporary means of providing power to equipment and they are not run through doors, walls, floors or any other location where they could be damaged.
4. *Coffee pots and their cords are in a location where they do not create a physical, fire or spilling (burn) hazard.* Coffee pots are located such that they do not create a projection hazard, they are not too close to combustible materials and they are not likely to be knocked over and spilled.
5. *Space heaters are located in an open area away from combustibles.* Space heaters must be used in an open area of the office away from combustible materials. Do not place space heater under desks.
6. *Electrical panels are accessible.* If existing, electrical panels in the office are immediately accessible with no less than 36 inches clear distance in front of them.
7. *There are no obvious fire hazards.* There are no other obvious fire hazards within the room, e.g. gasoline cans and flammable chemicals.

APPENDIX F – IGB LABORATORY SAFETY INSPECTION FORM

IGB Laboratory Safety Inspection Form				
Location:		Today's Date:		
Supervisor		Inspector		
Supervisor		Inspector Title:		
Department:		Department:		
Phone/E-mail:		Phone/E-mail:		
Refer to the <i>Instructions for the IGB Laboratory Safety Inspection Form</i> for a more detailed description as to what to look for when checking each item.				
General Safety				Comments
Door signs list laboratory personnel names and phone numbers; special hazards are identified (should be the approved sign)	Y	N	N A	
Door signs have current information (updated at minimum in yearly intervals)	Y	N	N A	
Housekeeping is satisfactory, including no excessive storage	Y	N	N A	
Glass bottles, if stored on the floor, are protected from breakage	Y	N	N A	
Mechanical equipment is appropriately guarded	Y	N	N A	

Aisles and exits are unobstructed	Y	N	N A	
All food and beverage items, containers, and utensils are stored and used in an officially designated area that is outside of the laboratory work area and laboratory refrigerators; refrigerators are labeled for storage	Y	N	N A	
Vision is unobstructed in the laboratory door windows (needed for emergency response personnel)	Y	N	N A	
Materials are stored in such a way that they are stable and secure against sliding, collapse, falls, or spills	Y	N	N A	
Ceiling tiles are in place	Y	N	N A	
Any equipment used in unattended operation has an automatic shut-off	Y	N	N A	
Electrical Safety				
Circuits are properly loaded (including power strips)	Y	N	N A	
Cords of all electrical equipment are in good condition	Y	N	N A	
Cords are used properly (i.e., kept clear of aisles, sinks and heat sources)	Y	N	N A	
Any emergency cut-off switches are readily accessible	Y	N	N A	
Electrical equipment used in wet locations (within six feet of water) is GFCI protected	Y	N	N A	

Extension cords are used only for temporary purposes	Y	N	N	A	
Any extension cords in use are three-wire	Y	N	N	A	
Spark-producing equipment is not used in areas where flammable gases or liquids are used or stored (e.g., in chemical fume hoods)	Y	N	N	A	
Emergency/Safety Equipment					
All fire alarm pull stations are unobstructed	Y	N	N	A	
Fire extinguishers are available, unobstructed, and mounted properly	Y	N	N	A	
Suitable fire extinguishers are available where flammable or combustible liquids are used or stored	Y	N	N	A	
Fire extinguisher pressure gauges (if present) are in the normal range and the ties (if present) are not broken	Y	N	N	A	
Fire extinguisher service date is current	Y	N	N	A	
All fire extinguishers are undamaged	Y	N	N	A	
Emergency contact information (e.g., 9-911) is posted by the phone	Y	N	N	A	
Eyewashes are available and unobstructed, with highly visible signs indicating their locations	Y	N	N	A	

Safety showers are available and unobstructed, with highly visible signs indicating their locations	Y	N	N A	
Eyewashes and safety showers are tested periodically	Y	N	N A	
A first aid kit is available and stocked	Y	N	N A	
A spill clean up kit is available and stocked	Y	N	N A	
The following personal protective equipment is available as needed and in good condition: laboratory coats or aprons, safety glasses/goggles, full face shields, gloves appropriate for particular chemicals or biohazard, respirator (users must be trained for respirator use)	Y	N	N A	
Chemical fume hoods have been inspected in the last year (see inspection sticker)	Y	N	N A	
Chemical fume hoods are free from excessive storage (back baffle should also be free from obstruction)	Y	N	N A	
Biological Safety Cabinets have been certified within the last 12 months (see certification sticker)	Y	N	N A	
Biological Safety				
Laboratories have doors for access control	Y	N	N A	
Each laboratory contains a sink for washing hands	Y	N	N A	

The laboratory is designed so that it can be easily cleaned; no carpets or rugs are present	Y	N	N A	
Bench tops are impervious to water and resistant to moderate heat and chemicals used for decontamination of work surfaces and equipment	Y	N	N A	
Laboratory furniture is capable of supporting anticipated loading and uses. Chairs used in laboratory work are covered with non-fabric material that can be easily decontaminated	Y	N	N A	
If the laboratory has windows that open to the exterior, they are fitted with fly screens	Y	N	N A	
Durable, leak-proof containers are available to transport waste to the autoclave for decontamination	Y	N	N A	
Sharps disposal containers are present as needed for the proper disposal of laboratory sharps	Y	N	N A	
All containers and bags used for biological waste collection are closable and prominently display the international biohazard symbol	Y	N	N A	
Disinfectant is available for daily work surface decontamination and spill clean up	Y	N	N A	
Chemical Safety				
A Chemical Hygiene Plan (CHP) is available	Y	N	N A	

Any refrigerators used to store flammables is designed or appropriately modified for flammable storage, or is explosion-proof	Y	N	N A	
Chemical storage is in cabinets or stable shelving	Y	N	N A	
Chemicals are stored according to compatibility (refer to compatibility chart if necessary)	Y	N	N A	
All contained substances are labeled	Y	N	N A	
No excess flammable liquids are stored	Y	N	N A	
Peroxidizable chemicals are dated when opened and tested for peroxides every six months thereafter	Y	N	N A	
All chemical containers are in good condition	Y	N	N A	
All chemical (including waste) containers are sealed when not in immediate use (with no funnels left in place)	Y	N	N A	
Chemical inventory is available (not mandatory but recommended)	Y	N	N A	
Gas cylinders (at all times) and lecture bottles (when in use) are fastened securely	Y	N	N A	
All mercury devices (thermometers, gauges, switches, etc.) that can be replaced with a mercury-free alternative have been replaced	Y	N	N A	

Mercury thermometers are not present in heated ovens	Y	N	N A	
Traps are used when house vacuum is utilized for aspiration, filtering, etc. of any liquids	Y	N	N A	
Radiation Safety				
Contamination surveys are performed and documented as specified in permit conditions	Y	N	N A	
Records of radioactive materials inventory and use are maintained	Y	N	N A	
Radioactive waste receptacles are labeled and contents are recorded	Y	N	N A	
Protective clothing is available and used	Y	N	N A	
Absorbent paper, shielding, and handling devices are used when appropriate	Y	N	N A	
Radioactive material is secured when not attended	Y	N	N A	

Other Issues				

APPENDIX G – RESEARCH SAFETY IN UIUC LABORATORIES

The University of Illinois at Urbana-Champaign (UIUC) Division of Research Safety (DRS) has developed this fact sheet to provide general safety information for individuals working in laboratories. For details or other specific safety information, please refer to the DRS website (www.drs.uiuc.edu) or the references provided.

Security

- Keep laboratory doors locked when unoccupied.
- Perform an audit of your space and materials to ensure that they are safe, secure, and inaccessible to unauthorized personnel.
- Notify your departmental office and Public Safety (3-8911) if materials are missing from the laboratory.
- Ask unauthorized strangers to exit the room and notify your departmental office and/or Public Safety (3-8911), as appropriate.
- For more information, please see *Prudent Laboratory Safety and Security Practices* at

www.drs.uiuc.edu/labsecprac.htm.

Door Signage

- Post emergency signs on the outside of laboratory doors to provide necessary information to emergency providers.
- Maintain current and complete information on all signs.
- Identify specific biological, chemical, and radiological hazards, as needed.
- For more information, contact DRS (3-2755).

Emergency Procedures

- Review campus emergency procedures.
- Know who to call in case of an emergency (laboratory supervisor, 9-911, etc).
- Know what to do in the event of a biological, chemical, or radiological spill.
- Know the location of fire extinguishers, spill kits, first-aid kits, and other emergency equipment.
- Equip spill kits with the following items:

Fire Safety

- Store flammable and combustible materials in appropriate containers and cabinets.
- Avoid propping fire doors open.
- In case of fire:
 - Notify someone in the immediate area.
 - Activate the nearest fire alarm pull station.
 - Confine the fire by closing doors or windows if it is safe to do so.
 - Attempt to extinguish the fire only if you have been trained to do so and it can be done safely.
 - Do not use elevators.
 - If possible, call 9-911 to explain the nature of the emergency and/or meet the responding unit outside.
- For more fire safety information or fire extinguisher training, contact the Facilities and Services (F&S), Occupational Safety and Health Section (5-9828).

Housekeeping

- Keep laboratory bench tops, biological safety cabinets, laboratory chemical hoods, and floors clean and free of clutter.
- Keep aisles and corridors unobstructed for easy emergency exit.

Eating and Drinking

- Prohibit food and beverages in laboratory work areas unless they are part of a research project.
- Do not consume vitamins or medicine or apply cosmetics, such as lipstick or make-up, in laboratory work areas.
- Do not use refrigerators or microwaves in laboratory work areas to store or prepare any materials intended for human consumption.
- Label laboratory refrigerators and microwaves with the warning: “No Food or Drink Allowed.”
- Do not bring research materials into office space where food is consumed.

Personal Protective Equipment (PPE)

- Wear appropriate personal protective equipment (gloves, safety glasses, lab coats, etc.) when working with biological, chemical, and radioactive materials.

- Keep personal protective equipment readily available for anyone entering the laboratory.
- Avoid contact with common-use equipment, such as phones, copiers, and computers, when wearing contaminated personal protective equipment, such as gloves.
- Remove all personal protective equipment before leaving the laboratory and entering offices, common hallways, or other non-laboratory areas.

Hand Hygiene

- Keep in mind that hand-washing is an extremely simple and effective means of preventing the spread of infectious agents.
- Check that a sink for hand-washing is available in every laboratory where biological materials and chemicals are used.
- Wash hands:
 - Before leaving the laboratory and entering offices, common hallways, or other non-laboratory areas.
 - After removing gloves worn for any reason.

Material Storage and Transport

- Label all containers that have biological, chemical, and radioactive materials, including water, with the material's proper name and associated hazards. This includes temporary (e.g., transfer) and secondary containers.
- Do not place or store containers on the floor unless secondary containment is being used.
- Store incompatible materials in separate locations or with containing devices to prevent accidental contact between materials.
- Use appropriate container carriers or secondary containment when moving materials from one room or building to another.

Working with Biohazardous Materials

- Be familiar with the Biosafety Level appropriate for the work you will be doing.
- Adhere to standard microbiological practices and applicable special practices for containment.

- Use personal protective equipment and safety equipment (biosafety cabinets, safety centrifuge cups, etc.) when necessary to protect yourself and the surrounding environment from contamination.
- For more information, please see *Biosafety in Microbiological and Biomedical Laboratories* at www.drs.uiuc.edu/bss/index.htm.

Working with Chemicals

- All laboratories that have chemicals must have a Chemical Hygiene Plan (CHP) that addresses the safe use, proper storage, engineering controls, personal protective equipment, and emergency response procedures for chemicals in the laboratory.
- Be familiar with and follow the CHP.
- Know how to use Material Safety Data Sheets (MSDS).
- For more information on MSDS, please see *Material Safety Data Sheets* at www.drs.uiuc.edu/css/msds/index.htm.
- For more information on chemical safety, please see *UIUC Chemical Safety Guide* at www.drs.uiuc.edu/css/safety/index.htm.

Radiation and Lasers

- Minimize exposure-time, maximize distance from radiation sources, and use appropriate shielding to control external hazards.
- Use personal protective equipment and safety equipment (shields, laboratory chemical hoods, etc.) to protect yourself and the surrounding environment from contamination.
- Use proper protective eyewear and follow the laboratory's safe operating procedures for work with lasers.

Laboratory Chemical Hoods

- Make sure laboratory chemical hoods are functioning properly (check for air flow and survey sticker) before use.
- Ensure that baffle openings are not blocked.
- Minimize foot traffic past the face of the hood and other air flows that could interfere with the capture of contaminants in the hood.
- Keep the sash closed as much as possible.
- Keep your head out of the hood when contaminants are being generated.
- Keep the hood clean and uncluttered.

- Use a perchloric acid hood if using perchloric acid at elevated temperatures.
- Do not store chemicals or apparatus in the hood.
- Conduct work at least six inches into the hood.

Biological Safety Cabinets

- Ensure that Biological Safety Cabinets (BSCs) are tested and certified by a professional cabinet certifier at the time of installation, annually thereafter, and any time the unit is moved.
- Decontaminate BSC work surfaces before work begins, after spills, and after work is completed.
- Prohibit gas lines, open flames, and toxic chemicals in recirculating BSCs.
- Recognize that BSCs are designed to contain microbiological contaminants and should never contain chemicals or be used in place of a laboratory chemical hood unless the unit is specially designed and certified for such activity.
- For more information, please see the *Using Biological Safety Cabinets* fact sheet at www.drs.uiuc.edu/bss/fact/index.htm.

Electrical Safety

- Use only three-wire extension cords.
- Replace wires that are in poor condition.
- Do not chain power strips together.
- Use GFCI outlets near water sources.
- Call F&S (3-0340) if a circuit breaker trips more than once.

Disinfection

- Keep a chemical disinfectant available for daily work surface decontamination when working with biological materials.
- Make sure that the disinfectant used is effective against the agent(s) of concern.
- Prepare bleach solutions fresh daily if using for decontamination (10% recommended). Note: As a corrosive, bleach may not be appropriate for use in all situations.

Biohazardous Waste

Cultures, Stocks, and Disposable Labware

- Know that cultures, stocks, and disposable labware utilized in work with biological materials must be treated before disposal using an approved decontamination method such as autoclaving.

- Collect waste in designated, closable containers, separate from regular trash.
- Make sure the international biohazard symbol is prominently displayed on **all** containers and bags.
- Overbag autoclaved material with an opaque trash bag, seal, and dispose of in the regular trash.
- For more information, please see the *Treatment and Disposal of Biological Materials* fact sheet at www.drs.uiuc.edu/bss/fact/index.htm.

Pathological waste

- Know that pathological waste includes animal carcasses, tissues, and organs, and human tissues and organs.
- Be aware that pathological waste is treated and disposed of by DRS.
- For more information, please see the *Treatment and Disposal of Biological Materials* fact sheet at www.drs.uiuc.edu/bss/fact/index.htm.

Sharps



- Use extreme caution when handling any “sharps” (razor blades, scalpels, syringes, needles, Pasteur pipettes, blood vials, microscope slides, coverslips, and

biologically contaminated broken glass).

- Dispose of sharps in an approved sharps disposal container available from Campus Stores without charge.
- Contact DRS for free pick-up of full sharps containers.
- For more information, please see the *Handling and Disposal of Laboratory Sharps* fact sheet at www.drs.uiuc.edu/bss/fact/index.htm.

Glass Disposal

- Glassware contaminated with toxic or carcinogenic chemicals should be placed in a bag, sealed in a cardboard box, and labeled as contaminated debris (please identify the contaminant). Disposal should then be requested by submitting a chemical waste pickup request form. For more information, please see the *UIUC Chemical Waste Management Guide* at www.drs.uiuc.edu/css/guide/index.htm.
- Glassware used with radioactive materials should be decontaminated before disposal. For more information, please see Chapter 8 of the *Radiation Safety Manual* at www.drs.uiuc.edu/rss/manual/index.htm.

- Uncontaminated glassware that does not meet the definition of a sharp should be disposed of in a sealed cardboard box and placed in the regular trash.

Radioactive Waste

- Collect radioactive waste in designated containers, separate from regular trash.
- Collect short-lived and long-lived radioisotopes separately.
- Under certain circumstances, water-soluble liquid waste may be disposed of through the sanitary sewer.
- Keep accurate records of the amount of radioactive material generated in waste.
- For more information, please see *UIUC Radioactive Waste Management* at www.drs.uiuc.edu/rss/ram/radwaste.htm.

Chemical Waste

- Absolutely no liquid or solid chemicals can be disposed of in the regular trash, even if considered non-hazardous.
- Keep containers closed at all times except when waste is being added.
- All containers must have a descriptive label that includes the word “Waste” so that the contents can be easily identified. If generic names such as “Waste

Halogenated Solvents” are used, keep a list nearby to identify the chemicals in the container.

- Avoid excessive accumulations of waste.
- For more information and Chemical Waste Pickup Request Forms, please see the *UIUC Chemical Waste Management Guide* at www.drs.uiuc.edu/css/guide/index.htm.

Additional Resources

This fact sheet addresses only general safety precautions for working in laboratories. For details on specific requirements, please consult the following resources:

- **DRS website** (www.drs.uiuc.edu)
- **Biosafety in Microbiological and Biomedical Laboratories**, CDC/NIH, 4th ed., 1999 (www.drs.uiuc.edu/bss/index.htm)
- **UIUC Chemical Safety Guide** (www.drs.uiuc.edu/css/safety/index.htm)
- **UIUC Chemical Waste Guide** (www.drs.uiuc.edu/css/guide/index.htm)
- **UIUC Radiation Safety Manual** (www.drs.uiuc.edu/rss/manual/index.htm)
- **Prudent Practices in the Laboratory**, National Research Council, 1995 (books.nap.edu/catalog/4911.html)
- **Safety in Academic Chemistry Laboratories**, American Chemical Society, 7th ed., 2003 (membership.acs.org/c/ccs/pub_3.htm)

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