UNIVERSITY of GUELPH

CHANGING LIVES IMPROVING LIFE

Laboratory Safety Manual

School of Engineering

2nd edition, 2013

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1) Introduction

The School of Engineering is dedicated to providing a safe and comfortable environment for research and teaching. This handbook provides a broad overview of safety programs at the School of Engineering (SoE). It does not provide information on all possible scenarios or harmful situations and thus is supplemented by general and specific safety training as well as many other resources online and across the campus. If unsure of any aspect of the laboratory be sure to obtain the information before starting any experiments.

All laboratories are different requiring different chemicals and equipment and therefore cause different hazards. It is important to know exactly what hazards to be wary of and the necessary procedure to follow if one occurs. The school does its best to provide the knowledge and understanding to avoid or minimize unnecessary risks.

2) Responsibility for Safety

Everyone at the University has a stake in maintaining a safe environment. At work, at school and at home, each one of us is accountable for our own actions. When one takes on a position of authority, he/she assumes additional responsibility for the safety of those under their supervision as well as their own.

Be aware that the Ministry of Labour is an enforcement agency. Inspectors have right of entry, power to issue orders, to ticket and lay fines against individuals and the institution. It is also important to note that in 2004 the Criminal Code was amended to allow the crown to pursue criminal charges against corporations and individuals in case where there is reckless disregard for safety resulting in injury or death.

2.1. Safety Committees

The University of Guelph is committed to ensuring a safe working environment for all faculty, staff and students. In order to encourage University wide participation in maintaining a well-functioning **Internal Responsibility System**, the University maintains a Central Joint Health and Safety Committee (CJHSC) and Local Joint Health and Safety Committees (LJHSC) and/or Health and Safety Representatives on the main campus, the regional campuses and the research stations. The focus of the local committees is to conduct inspections, identify hazards and support local safety programs. Members of the central committee fulfill other requirements such as conducting accident investigations, attending to work refusals, and submitting formal recommendations to the employer.

These committees and representatives were reviewed and revised in 2008 to more accurately reflect the interests and needs of the University community and were formally approved by the Minister of Labour and meet the legal requirements prescribed by the Ontario Occupational Health and Safety Act.

These committees exist to represent your best interests, and the interests of your colleagues. If you have an issue you would like the committee to investigate, feel free to contact a committee co-chair.

There is also a mailbox in the mailroom slot specifically for the Engineering department's safety committee. The committees are always happy to help with any questions or concerns you may have.

2.2. Laboratory Supervisor Responsibilities

According to the Ontario Health and Safety Act (OH&S Act of Ontario Sec. 1) a 'Supervisor' is *a person who has charge of a workplace or authority over a worker*. Within the laboratories in the School of Engineering, 'supervisors' consist of faculty members, laboratory technicians, and course instructors. Individual faculty members are responsible for all matters of health and safety in the lab for the graduate students they directly supervise. For courses with a lab component, the course instructor and the laboratory technician are responsible for all matters of health and safety in the lab exercises pertaining to that course. The department head may appoint a supervisor for each lab.

This supervisor is responsible for all matters of health and safety in the lab and will keep the records pertaining to health and safety for the lab.

The responsibilities of the supervisor are as follows:

1. Ensure that an appropriate safety orientation lecture has been given to workers when they are first assigned to a laboratory space or prior to starting the first experimental work. This training should include:
    a. General safety orientation
    b. Training on special or unusual hazards in the lab
    c. Training in the use of laboratory specific emergency equipment and emergency response;
2. Ensure that all workers have taken WHMIS training.
3. Ensure that adequate emergency equipment is in proper working order and readily available.
4. Ensure that an incident investigation report is completed for every incident or injury that occurs in his/her lab.
5. Ensure that safety and housekeeping inspections of the lab are conducted and recorded on a monthly basis.
6. Ensure that an appropriate alternate is appointed as supervisor when the laboratory supervisor is absent. In a teaching lab where safety is a concern, the supervisor or alternate will always be present. In a research lab, an alternate will be appointed when the supervisor is away from the campus.
7. Ensure that the worker has and uses appropriate safety gear. (e.g. Lab coat, eye protection, gloves, footwear)
8. Ensure that appropriate cautionary signs are posted and maintained.
9. Include safety as an agenda of all regular meetings.

2.3. Laboratory Participant Responsibilities

Laboratory participants consist of all individuals who perform procedures in a laboratory including students, graduate students, post-doctoral fellows, faculty members and staff members. Some laboratory participants may also have supervisory duties.

The responsibilities of the laboratory user are as follows:

1. Follow all applicable safety rules and practices
2. Using and wearing personal protective equipment according to instructions
3. Report all incidents to the supervisor/laboratory technician no matter how trivial it may seem
4. Report all unsafe conditions to the supervisor/laboratory technician
5. Attend all training courses as directed by the supervisor/laboratory technician

3) Safety Resources

If you have any question regarding the safety of a chemical, experiment or apparatus then immediately ask your supervisor. Issues that can't be easily addressed can be raised to the departmental safety committee, department chair, the Environmental Health & Safety department, or other resources across campus.

3.1. General Resource Information

This handbook covers basic safety knowledge – if you need specific information on any aspect of the legislation, departmental procedures, or the controls necessary for the various physical, chemical, biological, or radiological hazards, more detailed resources are available and are discussed in further detail below.

The University of Guelph operates under the Ontario Occupational Health and Safety Act (RSO 1990 c.O.1) (OSHA), http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o01_e.htm, which is administered by the Ministry of Labour. The central premise of the OHSA is the **Internal Responsibility System**, which prescribes certain rights and responsibilities for workers, supervisors, and employers.

All employees of the University of Guelph have 3 fundamental rights under the OHSA:

- The right to **know**.
- The right to **participate**.
- The right to **refuse** unsafe work.

In addition, employees have some common responsibilities under the Act:

- Follow safe work practices & wear protective equipment when appropriate.
- Report all hazards or defects that may become hazards.
- Avoid putting your safety or the safety of others in jeopardy.

As well, when you are in a position of authority you are required to:

- Ensure people under you are following safe work practices and using the correct protective equipment.
- Point out potential hazards so people are aware of dangers in the workplace.
- Take every reasonable precaution in the circumstances to protect the health and safety of those under you as well as the general public (i.e., exercise due diligence).

- The University's Environmental Health & Safety department (EHS) has a useful website (www.uoguelph.ca/ehs), where you can access all University safety policies, register for safety training sessions, and review resources and guidance on many aspects of the University's environmental, health and safety programs.
- For further information on University security and emergency preparedness, check out the websites of Campus Community Police (www.police.uoguelph.ca) and the Fire Prevention Office (www.fire.uoguelph.ca).
- The Ontario Occupational Health & Safety Act (RSO 1990, c.O.1) and provincial occupational health and safety regulations are available online at www.e-laws.gov.on.ca. The Canadian Centre for Occupational Health & Safety has many great resources for workplace safety and can be accessed at www.ccohs.ca.
- Hardcopies of required and essential information are posted on the EHS Bulletin Boards across campus, including:
    - University of Guelph Environmental Health & Safety Policy.
    - Referral to Ontario Occupational Health & Safety Act.
    - Contact information for Central and Local Safety Committees.
    - 'Injury at Work' (a.k.a., Form 82) which is a document from the WSIB that lays out the 4 steps to be taken post-injury.
    - All relevant Ministry of Labour Notices or Orders.

You are always welcome to discuss any safety or environmental issues with the University of Guelph EHS department.

4) Safety Training

Training is a critical component of any safety program to ensure that you have adequate knowledge to complete the tasks assigned of you. The training available is partitioned in two categories: general training and specific training. These are further explained in the following subsection.

Asking for guidance is a critical component of a safe working environment; if unsure of any aspect of a procedure or experiment make sure to clarify with a supervisor prior to starting.

4.1. General Safety Training

General training may be provided by the School of Engineering, the University EHS Department and external third parties. Courses included are WHMIS, Laboratory Safety, Introductory Biosafety, Radiation Safety, and First-Aid/CPR.

Requirements and descriptions are as follows for these safety courses:

WHMIS – Under the Occupational Health and Safety Act WHMIS training is mandatory for any person working with or in proximity of hazardous materials. As a service to the University community, EHS offers for new employees and graduate students, WHMIS training. This online training module provides generic information about WHMIS.

Laboratory Safety – Within laboratory environments across the University community, extensive research is conducted and valuable diagnostic and analytical services are provided. All individuals who work in a laboratory setting need to be familiar with the types of hazards associated with this environment and must receive appropriate training so they can work safely and within the confines of all associated legislation. This online module focuses on chemical safety in the laboratory while also discussing general lab safety and hazardous waste management issues.

Introductory Biosafety – For principal Investigators (faculty and professional staff), laboratorians, animal care personnel, and personnel who may handle human-derived material. Attendees should have some knowledge of pathogens and disease transmission, microbiology/molecular biology techniques, medical lab procedures, and/or recombinant DNA techniques.

Radiation Safety A– Designed, as part A of a two part course, to introduce prospective Users of nuclear substances and radiation devices to those health physics concepts needed to understand good safety practice in the lab. Part B completes the session with introduction to rad-safety rules, regulation and good practice.

Radiation Safety B – Part B completes the session with introduction to rad-safety rules, regulations and good practice.

First-Aid/CPR – This WSIB approved one day course delivers Emergency First Aid, based on Canadian Red Cross program, and adult, child, infant Cardiopulmonary Resuscitation, CPR, from the Heart and Stroke Foundation. The use of AEDs (Automated External Defibrillator) is also now included.

These courses may be offered in a class setting or on-line. For more information on these courses or to register for a course, please refer to the EHS courses site: www.uoguelph.ca/ehs/courses/.

4.2. Specific Training

Job-specific training is the responsibility of each lab or work group. This includes on-the-job demonstration of equipment, lab methods and experimental techniques. If you are unsure of how to safely and properly complete a task, ask for assistance before doing anything further otherwise you could jeopardize your safety as well as others around you. It is the responsibility of the supervisor of each laboratory room to ensure that all individuals working have completed the necessary training prior to entering and conducting experiments.

5) Emergency Procedures

Identifying and knowing when an emergency is occurring is one of the most important factors to help reduce the fear of the unknown. Knowing what to do for each type of situation could save your life or a fellow lab worker. Some of the more common laboratory emergencies are described in this section.

5.1. Fire

First and foremost, when you hear a fire alarm, evacuate the building immediately and do not use any elevators to do so. If a fire starts in the room you are working in, you may assess it. A small and

controllable fire may be put out with a portable extinguisher using the **P-A-S-S** method described below. For fires that are not controllable, evacuate right away and activate the alarm pull station on your way out.

Evacuation is mandatory and the Fire Prevention Officer may take disciplinary action against anyone refusing to leave the building.

To operate an extinguisher, the **P-A-S-S** method is used:

P – Pull the pin.

A – Aim the nozzle at the base of the fire.

S – Squeeze the trigger.

S – Sweep from side to side.

Please refer to the University of Guelph's Fire Safety Plan for more detailed information regarding fire safety. The Fire Safety Plan and other related information can be found on the Fire Prevention website here: http://www.fire.uoguelph.ca/.

5.2. Spills

The first task when witnessing or discovering a spill is to identify the contents of that spill and the potential harm it may cause. Never try to clean up a spill of an unknown substance, whether it is a powder or a liquid. Some materials such as picric acid are very explosive requiring only small amounts of heat, shock, or friction. It is always better to minimize the size, harmfulness and likelihood of a potential spill when possible.

5.2.1. Water or Flooding

If you come across a flooded area and it is safe to do so, try to cut off the source of the water such as a sink left running, etc. If the water has raised to a level high enough to reach electrical outlets or if any cords are submerged under the water evacuate anyone from the area and contact Physical Resources at x53854. Outside of regular hours, notify Campus Police at x52245 or x2000. Knowledge of hazards is important for you as well as others, placing a Wet Floor sign can prevent a slip of someone unaware of a slick floor.

5.2.2. Chemical Spill

Chemical spills are classed as major (i.e. you need help) or minor (i.e. you can handle it yourself). The critical factor in chemical spill emergencies is realizing when you need to evacuate and get help. If you are ever in doubt of your ability to handle and clean a chemical spill, evacuate the lab and dial x2000 for assistance.

A major spill requires evacuation and to get help if:

- You are not comfortable cleaning yourself.
- It is greater than 4L and is flammable, combustible, or other organic liquid.

- Poses a risk of fire or explosion.
- Creates a respiratory hazard (e.g., corrosive vapours, highly toxic chemicals).
- Involves unknown chemicals.
- Involves>1L of a strongly concentrated oxidizing acid (e.g., nitric, perchloric or chromic acid).

If you have been splashed with a hazardous chemical, flush the area with water immediately either in the emergency shower, sink, or eyewash stations. Remove all contaminated clothing and continue to flush the area; caustic or corrosive chemicals trapped against your skin can cause severe burns. It is a good idea for the lab to contain a set of coveralls for use after flushing.

Certain chemicals such as hydrofluoric acid, mercury, and formaldehyde require specific neutralizers or absorbents not commonly found in lab spill kits. If these materials are present in your lab, ensure that the spill kit has the additional items necessary for those chemical spills and that all lab workers are familiar with their use.

5.2.3. Biohazard Spill

The first consideration is your safety. If biohazardous material has spilled on you, remove contaminated clothing and thoroughly wash the affected areas. If material gets in your eye, flush at the eyewash station for 15 minutes. If it is a spill that creates a hazard for others in the area (e.g., aerosolized pathogen), notify everyone in the lab and have them evacuate immediately.

Avoid inhalation of any pathogens. If the spill is in the lab and there is concern of airborne exposure, evacuate the room and allow 30 minutes for aerosols to settle. If the spill occurs in a biosafety cabinet, lower the sash and ensure the fan is running for at least 10 minutes. If a tube of pathogenic material breaks in a centrifuge, put a sign on the equipment and leave the centrifuge closed for 30 minutes to allow droplets to settle before attempting to clean the spill. The lab should have an easily accessible disinfectant that can be used for small spills.

5.3. Medical Emergency

5.3.1. First-Aiders

Obtain first-aid assistance. Additionally, the University's first-aid stations are:

- Student Health Services, JT Powell Building
- Occupational Health and Wellness (OHW), Alexander Hall
- Campus Police/Fire Prevention, mobile service

Students may obtain further medical treatment from Student Health Services. Employees can seek medical treatment or advice through Occupational Health and Wellness. **For emergencies, dial x2000 and request emergency assistance.**

5.3.2. Critical Injuries

Severe injuries require immediate notification of EHS. If an injury meets the regulated definition of '**critical**', the Ministry of Labour must be notified and the scene preserved.

A **critical** injury is one that:

- Is potentially life-threatening.
- Causes loss of sight in an eye.
- A burn to major portions of the body.
- Produces unconsciousness.
- Causes substantial loss of blood.
- Causes fracture of an arm, leg, hand or foot (but not finger or toe)
- Causes amputation of an arm, leg, hand or foot (but not finger or toe)

For non-critical injuries, notify your supervisor as soon as possible and ensure an Incident Report is submitted to OHW (Fax: (519) 780-1796) within 24 hours. Incident Report Forms are available through the EHS website at: https://www.uoguelph.ca/hr/ehs/health-and-safety-policy-listing .

5.3.3. Specific Incidents

- **Cuts** – if someone suffers a severe cut, place pressure on the wound, and if possible elevate the wound above the heart.
- **Punctures** – if the object is still lodged in the person's body, do not remove it. Call x2000 immediately and request medical assistance.
- **Fainting** – if someone is about to faint, have them sit or lie down. If they have fainted in a seated position, steady them and put their head between their knees. If they have fallen to the ground, roll them on their back and elevate the legs 20-30 cm. If someone sustained an injury during the fall, begins convulsing, or does not recover within two minutes, dial 2000 and request emergency medical assistance.
- **Needle sticks** – rinse the wound for 15 minutes. Determine whether it is a clean or potentially dirty needle. If the needle could be contaminated with an infectious substance, advise the victim to immediately contact Occupation Health and Wellness (x52647) or Student Health Services (x52131) and seek medical treatment. Outside of regular hours, advise the victim to seek immediate medical treatment (i.e., Emergency Room). Prophylaxis for hepatitis and HIV must be started as soon as possible following exposure.
- **Seizures** – help the person to the floor and clear away nearby objects. Try to prevent the person from striking objects in the area and harming themselves during the seizure. Do not attempt to restrain the victim or force anything into their mouth. Placing any object in the mouth of a seizure victim only increases the likelihood of choking. Dial x2000 immediately and request medical assistance; be sure to inform them if the victim is having trouble breathing or any other relevant details.
- **Choking** – call for help. If the airway is only partially obstructed and there is air exchange, encourage the victim to continue coughing. If the airway is fully obstructed administer the Heimlich maneuver.
- **Cardiac emergency** – if someone is showing symptoms of a heart attack (sudden arm pain, chest neck or back; pale skin), call x2000 and request and ambulance be sent to your location. Get the person to a sitting position and remove any constrictive clothing. Monitor their pulse and

provide reassurance. If the victim goes into cardiac arrest and you are trained, administer CPR until emergency authorities arrive.

5.4. Active Threat

If you become aware of a violent situation, such as an armed person on campus:

- If possible, lock yourself in the nearest safe room and stay out of sight.
- If safe to do so, dial x2000 and request help.
- If you are certain you can get to an exit safely, move quickly and evacuate the building.

5.5. Power Outage

Many of the areas occupied by the School of Engineering are supplied with back-up power by generator, either from a stand-alone system or via the university's essential service grid. The time required for back-up power to come back on-line is typically up to 30 seconds. If the power does go out, stay where you are for a moment to see if it comes back on. If it does not, check to see if the rest of the building is out as well. If it is a problem in only a portion of the building, have one person contact the Physical Resources work order desk at x53854.

If it is a widespread outage and back-up power has not come on-line, before leaving the lab for any length of time, shut off any open gas valves, compressed air/vacuum valves, light switches, fans, and any other equipment. One person from the department should call Physical Resources to notify them of the outage. Also ensure the rest of the department is notified by informing the director's office.

Fume hoods and biosafety cabinets must be closed in a power outage to prevent migration of hazardous aerosols or vapours into the lab. Keep away from the hoods to prevent introducing air currents and minimize exposure to any accumulated vapours or aerosols.

5.6. Unknown Evacuation

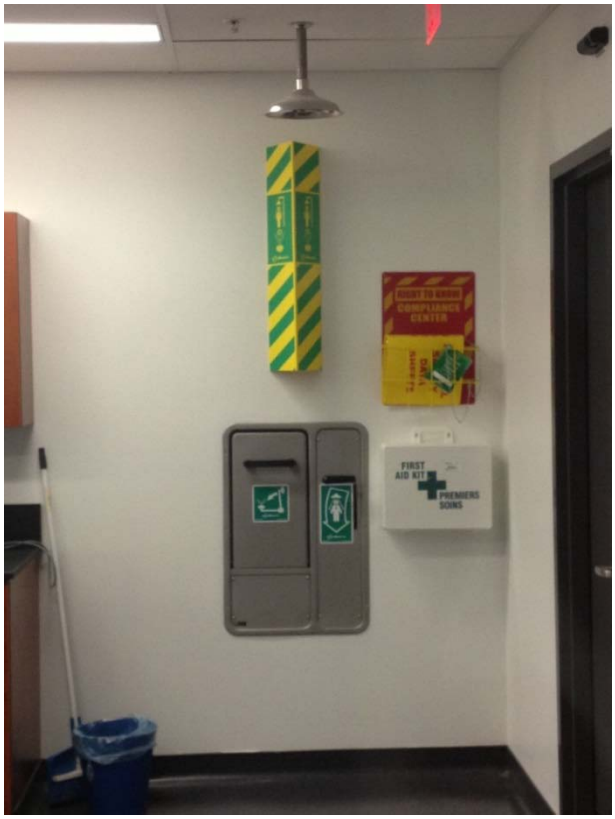
Do not assume that an alarm only means fire; it could also mean a toxic spill or other threat. When you hear the evacuation alarm, immediately:

- Extinguish any open flames and close any open gas valves.
- Close the sash on fume hoods and biosafety cabinets (BSCs).
- Exit the lab, and close the door behind you.
- Move quickly and calmly to the nearest safe exit or stairwell.
- Do not attempt to use the elevator.
- **Once outside, move well away from the building.**
- Pass any relevant information you have on to the fire wardens.
- Re-entry to the building may proceed once the alarm bells have stopped ringing unless instructed otherwise by emergency response personnel.

Anyone requiring assisted evacuation must be moved to the landing of the nearest safe stairwell. Ensure a fire warden or colleague notifies the emergency authorities of the person's location.

5.7. Emergency Equipment

It is imperative that you are familiar with the laboratory you are working in so you can respond quickly and accurately in an emergency situation. Knowing the location of the nearest exits, telephones, eye wash stations, showers, sinks, fire blankets, fire extinguishers and spill kits are important before starting any experiments.



Specific emergency equipment is located in all laboratories, labs working with chemicals or biologic pathogens contain safety showers and emergency eye wash stations as well as general first-aid kits. There are also fire extinguishers throughout the building either built into the wall or hanging in red boxes accompanied by a metal bar used to break the outer glass.

In an emergency situation, the following procedure should be followed:

1. **Alert personnel in the immediate vicinity**
2. **Confine the emergency if possible**
3. **Summon aid (Dial x2000 or 911)**
4. **Report pertinent information to the responding emergency personnel**

5.7.1. First-Aid Kits

The smaller first-aid kits contain:

- **First-Aid & Emergency Care Guide**
- Plastic Bandages
- Gauze Bandage Rolls (various sizes)
- Gauze Pads
- Compress Bandages
- Triangular Bandages
- Clear Plastic Tape
- Scissors
- Safety Pins
- Nitrile Gloves
- CPR Face Shield with One-way Filtered Valve

The larger first-aid kits contain all of these items as well as an emesis basin, wood splint set of various sizes and splint padding.

5.7.2. Eye Wash Stations

In the case of chemical splashes to the eyes, eye wash stations can be used to flush out the eye. In such an emergency, follow the procedure listed below:

- Go to the nearest eye wash station and rinse for at least 20 minutes.
- If you are wearing contact lenses, remove them as quickly as possible while continuing to flush.
- Hold your eyelids open with your fingers.
- Roll your eyeballs, so that water can flow over the entire surface of your eye.
- Lift your eyelids frequently to ensure complete flushing.
- Cover the injured eye with dry sterile gauze pads while waiting for medical attention.

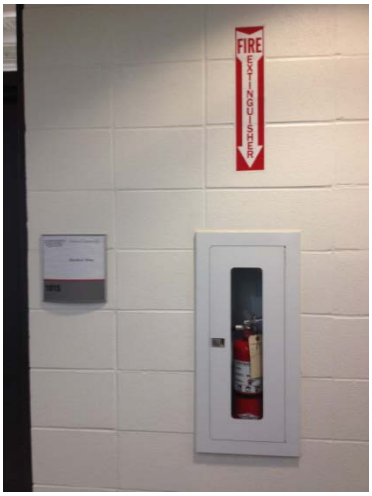
5.7.3. Emergency Showers

If there is a chemical splash to the skin, determine if it involves a small or large area of skin. If the chemical splash involves a small area of skin, proceed to the nearest sink, remove contaminated clothing and jewelry and rinse area for 15 minutes. If the chemical splash involves a large area of skin, follow the procedure listed below:

- Splash victim should proceed immediately to the nearest emergency shower.
- Rinse area thoroughly in the shower for at least 20 minutes.
- Remove contaminated clothing while in the shower.
- Wait for medical attention.

5.7.4. Fire Extinguishers

The Fire Prevention Office has created a video to demonstrate proper use of a fire extinguisher – it is available at this URL: http://www.fire.uoguelph.ca/fire_extinguisher.html.



As previously mentioned, the **P-A-S-S** method is utilized, to operate an extinguisher:

P – Pull the pin.

A – Aim the nozzle at the base of the fire.

S – Squeeze the trigger.

S – Sweep from side to side.

Although fire extinguishers can be used to put out small fires, it does not mean that they can put out all types of fires. There are multiple classes of fires as well as specific extinguishers for each fire class.

Table 1 - Classes of Extinguishers

CLASSES OF FIRES	TYPES OF FIRES	PICTURE SYMBOL
A	Wood, paper, cloth, trash & other ordinary materials.	
B	Gasoline, oil, paint and other flammable liquids.	
C	May be used on fires involving live electrical equipment without danger to the operator.	
D	Combustible metals and combustible metal alloys.	
K	Cooking media (Vegetable or Animal Oils and Fats)	

	The background of the symbol will be either Metallic or Green. It will always be found on Water, Multi-Purpose Dry Chemical and Foam Type extinguishers and sometimes Halon extinguishers. Examples of using a Class A extinguisher are wood, cloth and paper.
	The background of the symbol will be either Metallic or Red. It will always be found on Dry Chemical, Multi-Purpose Dry Chemical, Carbon Dioxide, Halon and Foam-type extinguishers. Examples of using a Class B extinguisher are oils, greases, paint and gasoline.
	The background of the symbol will be either Metallic or Blue. It will always be found on Dry Chemical, Multi-Purpose Dry Chemical, Carbon Dioxide and Halon extinguishers. Examples of using a Class C extinguishers are computer monitors and appliances.
	The background of the symbol will be either Metallic or Yellow. It will always be found on special Dry Powder extinguishers, but it would be a rare case indeed for you to be faced with a Class D fire, especially in the home or office. Examples of using a Class D extinguisher are magnesium, sodium and potassium.
K	The background of the symbol will be white. Class K fires are fires that involve vegetable oils, animal oils, or fats in cooking appliances. This is for commercial kitchens, including those found in restaurants, cafeterias, and caterers.

Table 2 - Effectiveness of Fire Extinguisher Classes

	Class A	Class B	Class C	Class D
On which fires is Water used and why? Because it is an ideal cooling, soaking and penetrating agent. Its use on other classes of fire can be dangerous.	✕			
On which fires is Dry Chemical used and why? Because it is a flame-interrupting agent.		✕	✕	
On which fires is Multi-purpose Dry Chemical used and why? Because it melts and forms an oxygen-excluding coating over solid burning materials	✕	✕	✕	
On which fires is Carbon Dioxide used and why? Because it effectively suffocates the fire and leaves no residue.		✕	✕	
On which fires is Foam used and why? Because it is a smothering and blanketing agent. Do not use on Class C fires because foams can be conductive.	✕	✕		
On which fires is Dry Powder used and why? Because it is a special smothering and coating agent. It is not suited for use on other classes of fire.				✕

5.8. Monthly Inspections of Supplies and Apparatus

It is important that laboratory inspections be completed regularly to monitor and maintain the safety of each work area. In any given lab there can be a combination of physical, chemical, biological, and radiological hazards – diligence is required to control these hazards and keep work environments safe.

- Activate eyewash stations weekly to flush out contaminants, discourage microbial growth and ensure flow is adequate.
- Ensure access to the emergency eyewash/shower is not obstructed.

- Check the fire extinguisher – it should be easy to access (i.e., unobstructed), and the pressure indicator should be in the green area of the gauge.
- Check the spill kit – it should contain neutralizers (usually 3 – acid, base, and organic solvent suppressant), absorbent materials, gloves, goggles, a dustpan/scraper or dustpan/broom and bags for waste material.
- Check first-aid boxes – the kit should contain gloves, scissors, adhesive bandages, tape, gauze, and pads or compress bandages.
- Visually inspect chemical storage areas to ensure there is no leakage and incompatibles are separated each month.
- Look for issues with unsecured gas cylinders, poor housekeeping, electrical hazards, and access to exits.
- Report any issues to your supervisor.

6) Standard Operating Procedures

Standard Operating Procedures are documents that lay out specific directions on what to do in certain emergency situations, or the instruction on the use of common lab equipment. These documents will be present in labs containing these hazards and equipment.

Common Standard Operating Procedures for the College of Biological Science are available on the CBS Health & Safety Website, under 'CBS Safety Handbook, Procedures & Forms': www.uoguelph.ca/cbs/safety.

7) Machine Safety

In addition to the following safety tips, the guidelines from manufacturers of these and other machines not listed should be obtained and adhered to.

7.1. Hand Tools

Although hand tools appear to be very safe, there are some inherent hazards associated with their use. Some examples of hand tool injuries and their causes are listed below:

- Loss of eye/vision: using striking tools without eye protection.
- Puncture wounds: using a screwdriver with a loose handle which causes hand to slip.
- Severed fingers, tendons, and arteries: using a dull knife requires so much force that your hand may slip down the blade.
- Broken bones: using the wrong hammer for the job can smash a finger.
- Contusions: using a small wrench for a big job can bruise a knuckle.

The following basic safety guidelines should be followed when working with hand tools.

1. Always think before using a tool. Ask yourself: is the tool sized right for the job? Is the tool in proper working condition?
2. Make sure to use the tools for intended purposes.

3. Keep all hand tools in good condition.
4. Do not use worn tools as they can be dangerous. Inspect all tools before use.
5. Do not use tools beyond their capacity.
6. When using a screwdriver, never hold an object in one hand and press a screwdriver into it with the other. This could result in palm injuries. Use a table or bench to rest the object on or clamp to hold it in place.
7. Always wear the appropriate Personal Protective Equipment for the job. Protect your eyes, hand and ears as well as other body parts. Keep your clothing out of your work.
8. Always cut in a direction away from your body, never towards.
9. Pass a tool to another person by the handle.
10. Store tools properly when you are finished working with them.

7.2. Power Tools

Read and thoroughly understand the label warnings on tools you are using as well as the owner's operator's manual.

- Always wear safety goggles or safety glasses that include side protectors or a full face shield when needed.
- Wear hearing protection during extended periods of operation of noisy machinery.
- Use a dust mask or helmet and proper ventilation (dust collection system) in dusty work conditions.
- Tie back long hair; do not wear bulky gloves, loose clothing, jewelry or any dangling objects that may catch in rotating parts or accessories.
- Stay alert. Watch what you are doing, use common sense. Don't operate tools when you are tired or under the influence of drugs or alcohol.
- Never leaves machines running unattended. Turn power off and don't leave until machines come to a complete stop.
- Ensure that safety guards are in place before operating machines requiring them.
- Do not sand any material that will give off dangerous particulates.

Welding requirements:

1. Approval from lab technician or supervisor is required before using any welding equipment.
2. Welders, assistants, and anyone else in the welding area must wear glasses or shields of recommended shades during welding operations.
3. The welder is responsible for erecting a screen around the welding area to protect other personnel in the area from eye injury.
4. All welding equipment to be used must be inspected for possible damage prior to each use.
5. Do not handle oxygen bottles with greasy hands, gloves or rags as this is a cause of explosion.
6. Welding tanks must be strapped to a welding cart of fixed object. A gas cylinder must never be free standing. Safety cap must be replaced on all cylinders when not in use.
7. Be sure work and work table is properly grounded when arc welding.
8. Never arc weld in a wet area.

9. Be alert to possible fire hazards. Be sure that all flammable materials are removed from the work area. This includes degreasing or other cleaning operations.
10. A fire extinguisher should be nearby a work area where welding is being done. Be sure you know how to operate the fire extinguisher.
11. Working pressures must be controlled by a regulator, since above 15 psi acetylene will explosively polymerize.
12. Shut off all cylinder valves when the job is complete. Release pressure from the regulators by opening the torch valves momentarily and back out regulator adjusting valves. Never leave the torch unattended with pressure in the hoses.
13. Utilize protective equipment and clothing. Every part of the body should be covered.
14. Never weld in side enclosed spaces with adequate ventilation. Check the ventilation system before starting to weld.
15. Do not weld on painted, galvanized or greasy, oily metals.

7.3. Pneumatic (Compressed Air) Tools

Compressed air can be very dangerous, contrary to what some people may think. Air forced into the tissues or blood stream through the skin can cause an air embolism which can be potentially fatal if it reaches the heart, lungs or brain. Inflation injuries in the intestine can cause death and can be caused by air being directed at the anus. Air blown into the mouth can rupture the esophagus or the lungs. Ear and eye injuries such as blown eardrums, blindness and deafness can be caused from an air blast or flying particles.

The following safety precautions must be followed when working with compressed air and compressed air (pneumatic) tools.

1. Hoses and line should always be rated to meet the maximum operating pressure or the equipment.
2. Wear the proper personal protective equipment including:
    a. Safety Glasses with side shields
    b. Hearing protection
    c. Respiratory protections (depending on materials being worked with)
3. Never use compressed air to clean clothing or hair. Use a vacuum for cleaning, a pressure strong enough to dust or clean is strong enough to breach the skin and result in air embolism. Even a pressure as low as 5-10 psi can cause serious injury.
4. Never point compressed air at yourself or others.
5. Keep compressed air tools clean.
6. Never use an air hose that leaks and have it replaced immediately.
7. Stop using an air tool if it leaks and have the tool serviced or replaced.
8. Disconnect an air tool before attempting to fix jams.

8) Laboratory Safety

8.1. Hazard and Incident Reporting

8.1.1. Reporting of Hazardous Conditions

Under OHS law, every worker has a duty to report unchecked hazards. With the nature of our work across the school, there are many hazards; but with proper planning and precaution the risk can be controlled to an acceptable level. If you have concern about a hazard in your work area, start by discussing it with your supervisor or advisor. If the scope of the problem is too large or if there is question on what should be done, the issue can be raised to the department chair, the local safety committee and/or EHS.

Remember that as workers in Ontario, you have a legal right to refuse work that you legitimately feel would put you in danger. Refer to section 43 of the OHSA for more details (http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o01_e.htm#s43s1).

8.1.2. Incident Reporting

If you are injured at work, get appropriate first-aid and notify your supervisor as soon as possible. An Incident Report Form must be filled out, signed by the supervisor, provided to the department head and employee group and submitted to EHS within 24 hours – but if an injury is serious and potentially life-threatening, after getting help for the victim, call EHS (x53282) to report the incident as soon as possible. Allow Campus Police to notify the next of kin to avoid miscommunication and confusion.

Near misses (i.e., accident that were narrowly avoided) should be reported using the Incident Report Form. The Incident Report Form is available through the EHS website. http://www.uoguelph.ca/ehs/

8.2. Understanding Hazard Warning Information

8.2.1. Workplace Hazardous Materials Information System (WHMIS)

The Workplace Hazardous Materials Information System, or WHMIS, is a very important component of the hazard communication scheme in a university laboratory. WHMIS regulations set out requirements for the training of personnel, the labelling of hazardous materials, and the provision of Material Safety Data Sheets (MSDS).

Anyone working in a laboratory environment must receive WHMIS training.

Historically, each lab was required to keep a binder of printed Material Safety Data Sheets, which are only valid for 3 years. To eliminate this labour intensive inventory and updating requirement, the University has implemented an electronic MSDS system. However, the School of Engineering still advises that each lab keep a hardcopy of the solvents or chemicals on hand, but now there is also access to MSDSs through the internet database. MSDSs can be accessed from the University of Guelph network at: http://hq.msdsonline.com/uoguelph/Search/Default.aspx

8.2.1.1. Training

Every person working in a laboratory environment is required to receive WHMIS training. The EHS provides online training modules to meet this requirement. EHS offers training modules for Laboratory Safety, WHMIS, and Competent Supervisor and Due Diligence. Registration for these online modules can be completed by following the link: https://www.uoguelph.ca/hr/hr-services-environmental-health-safety-training/course-registration.

The WHMIS module has 5 units concluded by a final quiz to test your knowledge.

- Unit 01: Introduction to Legislation
- Unit 02: Getting Ready to Interpret Hazard Information
- Unit 03: Hazard Classification
- Unit 04: Sources of Hazard Information
- Unit 05: Applying Your WHMIS Knowledge
- Module Conclusion and Final Quiz

8.2.1.2. WHMIS Symbols

Figure 1 - Hazard Symbols of WHMIS

8.2.1.3. Material Safety Data Sheets (MSDS)

The Globally Harmonized System (GHS) will require MSDSs to be expanded to 16 sections. In preparation for this regulatory change, many suppliers are now generating WHMIS accepted, 16 section MSDSs instead of the previously acceptable 9 section MSDSs. The 16 sections are listed below:

1. Product and Company Information
2. Composition
3. Hazard Identification
4. First-aid Measures
5. Fire-fighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Control/ Personal Protection
9. Physical/Chemical Properties
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Disposal Considerations
14. Transport Information
15. Regulatory Information
16. Other Information

Material Safety Data Sheets must be readily available at the workplace. In order to facilitate this, the University has subscribed to MSDS Online, an extensive, searchable online database of Material Safety Data Sheets. An "e-binder" within MSDS Online has been established containing MSDSs for chemicals at the University of Guelph. Access to the master list of MSDSs is also available if required.

Hard copies of MSDSs are located in each laboratory room in larger MSDS binders located near the entrances. If there are too many chemicals to fit all the MSDSs in these binders then a computer terminal will be placed in these rooms specifically for accessing any additional information or sheets required.

For work groups whose workers do not have access to network connected computers MSDSs for all controlled products must be maintained in hard copy.

MSDSs are also available from chemical suppliers as well as Public Health Agency of Canada.

8.2.2. Toxicological Properties: LD_{50} and LC_{50}

Exposure to hazardous materials can occur by:

- Absorption;
- Ingestion;
- Inhalation; or
- Injection

LD_{50} and LC_{50} values are commonly used measurements for the toxicity of a substance.

LD_{50} (Lethal $Dose_{50}$) is the amount of a substance that, when administered by a defined route of entry (e.g. oral or dermal) over a specified period of time, is expected to cause the death of 50% of a

population. The LD_{50} is usually expressed as weight of test substance per kilogram of body weight (mg/kg or g/kg).

LC_{50} (Lethal Concnetration$_{50}$) is the concentration of a substance in air or water (depending on the test population) that, when administered by inhalation over a specified period of time, is expected to cause death in 50% of a population. The LC_{50} is usually expressed as parts of test substance per million parts of air/water (ppm) for gases and vapours, or as milligrams per litre or cubic metre of air (mg/L or mg/m^3) for dusts, mists and fumes.

Note that the lower the LD_{50} or LC_{50}, the more toxic that material.

8.2.3. Exposure Values

Exposure values are established concentrations that, if not exceeded, will not generally cause adverse health effects to the person exposed. Exposure values can be expressed as the following:

TWAEV (8-hour Time-Weighted Average Exposure Value): average concentration to which most workers can be exposed during an 8-hour workday, day after day, without adverse effects.

STEV (Short-Term Exposure Value): maximum average concentration to which most workers can be exposed over a 15 minute period, day after day, without adverse effects.

CEV (Ceiling Exposure Value): the concentration that must never be exceeded (applies to many chemicals with toxic effects).

8.3. General Laboratory Safety

All hazardous materials decanted from their original container must be labeled containers that will not leave the laboratory require only a product identifier (i.e., the name of the product written on the exterior). If a decanted hazardous material will be moved out of the lab, it requires a workplace label, which needs to include a product identifier, directions for safe handling, and a reference to the MSDS.

General safe principles and procedures:

1. All individuals working in a laboratory must have WHMIS training.
2. Familiarize yourself with safety procedures that apply to the work being done. Ask if you do not understand any aspect of your work.
3. Determine the potential hazards (e.g., physical, chemical, electrical, biological) and appropriate safety precautions before beginning any new operations. If you encounter any hazardous conditions during your inspection, **DO NOT BEGIN THE EXPERIMENT**.
4. Know the procedure to follow in case of accident or spill, where the first-aid and spill kits are located and how to use, and where to find the accident report forms to be filled out with the department.
5. Be familiar with the locations and use of emergency equipment including the telephone, fire extinguishers, activation of fire alarm, fire blankets, safety showers, and eye wash stations.
6. Know the emergency exits and evacuation routes and campus emergency telephone number. (CAMPUS POLICE x2000).

7. Always wear appropriate PPE (Personal Protective Equipment) for the task that you are carrying out (e.g. safety glasses, prescription glasses with side shields, laser goggles, gloves, safety shoes, lab coats). Open toed shoes, such as sandals, must never be worn in the lab.
8. Read operating instructions or ask for training by the technician or supervisor before operating any equipment. Always use the equipment for approved uses only.
9. The laboratory worker shall post suitable warning signs if a specific hazardous situation exists, pertaining to their activity; include the name and phone number of individual(s) responsible.
10. Tie back or otherwise restrain long hair when working with chemicals, biohazards, radioisotopes, or moving machinery.
11. Laboratory access is restricted to authorized persons only. Children are not permitted in labs. Visitors must be equipped with appropriate safety equipment before entering the lab.
12. Never engage in pranks, practical jokes or other acts of mischief.
13. Report hazards and accidents immediately to the supervisor or laboratory technician.
14. Avoid disturbing or distracting another worker while he/she is performing a laboratory task.
15. Walk; do not run, in the lab.
16. Do not sit or stand on laboratory benches at any time.
17. Know how to cut off electrical supply to the laboratory in the event of an emergency.

At the end of the experiment:

- Shut down the equipment and leave it in a safe condition for the next users. Turn off gas, water, electricity, vacuum and compression lines and heating apparatus.
- Return unused materials, equipment and apparatus to their proper storage locations.
- Label, package and dispose of all waste material properly. Remove defective or damaged equipment immediately, and arrange to have it repaired or replaced.
- Decontaminate any equipment or work areas that may have been in contact with hazardous materials.
- Leave behind protective clothing (lab coats, gloves, etc.) when leaving the laboratory room.
- Close and lock the door to the laboratory if you are the last one to leave.

8.3.1. Personal Protective Equipment (PPE)

Personal Protective Equipment is designed to protect many parts of the body. It should act as the primary barrier between the hazard and the worker. It does not reduce the hazard, only the risk. Personal protective equipment appropriate to the hazards must be worn (Ontario Regulation 851 Sections 79-86).

All personnel in a laboratory should consult their supervisor regarding PPE appropriate to the individual laboratory (Ontario Regulation 851 Section 79). It is the responsibility of the supervisor to select the PPE appropriate to the work being done. It is the responsibility of anyone working in the lab to use the PPE that is required.

PPE must not be considered the primary means of protecting the laboratory worker. Research procedures and engineering controls, such as fume hoods, must be considered first.

All the personnel in the lab should wear personal protective equipment, not just those actively working.

Personal Protective Equipment Includes:

- Gloves
- Eye and Face Protection
- Body Protection
- Respiratory Protection
- Hearing Protection
- Foot Protection
- Head Protection

8.3.1.1. Gloves

Gloves are to be used to provide protection against chemical or biological hazards and exposure to extreme temperatures, abrasions or lacerations. Table 3 - Guide to Hazard Based Glove Selection provides a general guideline to describe appropriate hazard-based selection of gloves.

Table 3 - Guide to Hazard Based Glove Selection

Hazard	Degree of Hazard	Protective Material
Abrasion	Severe	Reinforced heavy rubber, staple-reinforced heavy leather
	Less Severe	Rubber, plastic, leather, polyester, nylon, cotton
Sharp Edges	Severe	Metal mesh, staple-reinforced heavy leather, Kevlar® aramid-steel mesh
	Less Severe	Leather, terry cloth (aramid fiber)
	Mild with delicate work	Lightweight leather, polyester, nylon, cotton
Chemicals and fluids	Risk varies according to the chemical, its concentration, and time of contact among other factors. Refer to the manufacturer, or product MSDS.	**Dependant on chemical**. Examples include: Natural rubber, neoprene, nitrile rubber, butyl rubber, PTFE (polytetrafluoroethylene), Teflon®, Vitom®, polyvinyl chloride, polyvinyl alcohol, Saranex™, 4H®, Chemrel®, Responder®, Trellchem®
Cold		Leather, insulated plastic or rubber, wool, cotton
Heat	High temperatures (over 350 deg C)	Asbestos, Zetex®
	Medium high (up to 350 deg C)	Nomex®, Kevlar®, neoprene-coated asbestos, heat-resistant leather with linings
	Warm (up to 200 deg C)	Nomex®, Kevlar®, heat-resistant leather, terry cloth (aramid fiber)
	Less warm (up to 100 deg C)	Chrome-tanned leather, terry cloth
General Duty		Cotton, terry cloth, leather
Product Contamination		Thin-film plastic, lightweight leather, cotton, polyester, nylon
Radiation		Lead-lined rubber, plastic or leather

Taken from http://www.ccohs.ca/oshanswers/prevention/ppe/gloves.html, July 31, 2013

The following guidelines should be considered when using gloves:

- Inspect for damage prior to use. Any sign of deterioration, such as holes, tears or discoloration, should prompt immediate replacement of the gloves.
- Ensure appropriate fit and thickness to allow for required tactile sensitivity.
- Ensure appropriate length so as to provide adequate protection of the hand and arm.
- To remove: pull gloves inside out to prevent exposure to any contaminants during removal.

- Remove gloves prior to touching computers or phones, opening doors or otherwise contacting items that would be expected to be free of contamination (either biological or chemical).
- Wash hands thoroughly after removal of gloves.
- Reusable gloves should be stored and maintained in such a way as to prevent exposure (e.g. in a Ziploc bag) and should be stored within the laboratory work are. Manufacturer's instructions are to be followed as applicable.

8.3.1.2. Eye and Face Protection

Canadian Standards Association (CSA) approved eye protection is to be worn by students, employees and visitors in all areas where hazardous or unknown substances (either chemical or biological) are being stored, used or handled, where there is a risk of splash, projectiles or air borne particles or where there is harmful radiant energy.

- Minimum eye protection worn in the laboratory consists of approved safety glasses with permanent side shields. Safety glasses are designed to protect against impact and do not provide significant splash protection. Therefore safety glasses should only be worn in cases of light work not involving significant volumes of liquids.
- Goggles are to be worn when there is risk of splashing a hazardous material. Indirect vented goggles are preferred.
- Eye protection is to provide adequate impact and splash resistance appropriate for the work being done.
- Ultraviolet (UV) protective eyewear is required where there is risk of exposure to UV light.
- Face shields are to be used if an explosion or significant splash hazard exists such that there is a need to provide further protection to the face.
- Face shields are to be used in conjunction with primary eye protection (safety glasses or goggles depending on the hazard).
- Full size shields that can be placed directly in front of the hazard may also be used to provide additional protection to the entire body. These too, are only to be used in conjunction with goggles, lab coats, etc.

While wearing contact lenses in not prohibited in laboratories, an assessment of the specific circumstance or environment is to be made to decide whether or not wearing contact lenses presents a hazard to the worker and therefore if it should be prohibited. Contact lenses themselves do not provide eye protection and may actually decrease eye safety. Further information regarding the wearing of contact lenses in laboratory situations may be found at the following websites:

Canadian Centre for Occupation Health and Safety – OSH Answers:

http://www.ccohs.ca/oshanswers/prevention/contact_len.html

CDC-NIOSH – Contact Lens Use in a Chemical Environment

http://www.cdc.gov/niosh/docs/2005-139/

8.3.1.3. Body Protection

Lab coats and long pants are to be worn whenever hazardous chemicals, radiological or biological substances are being used or handled. Shorts do not provide adequate protection of the lower legs.

- Lab coats with snaps are preferred over lab coats with buttons to allow for quick removal of the clothing in the case of an emergency.
- Lab coats should have snaps or buttons fastened at all times while working in the lab.
- Lab coats are to be stored in the laboratory area to prevent biological or chemical contamination of non-lab areas.
- Lab coats are to be cleaned regularly and are to be laundered separately from all other clothing.

Aprons should be worn in addition to lab coats in situations where there is elevated splash hazard or the risk of injury follow a splash is high. Acid resistant aprons should be worn when working with large volumes (i.e. greater than four litres) of concentrated inorganic acids e.g. HCl, H_2SO_4. The use of aprons alone is discouraged as they provide inadequate protection of the arms.

Coveralls are generally not recommended in laboratory situations where flammable or corrosive liquids are being handled because of their potentially difficult removal should contamination occur.

8.3.1.4. Respiratory Protection

There are several types of respiratory protection that are appropriate for use in a laboratory setting depending on the work being performed. The use of a respirator should only be considered when permanent engineering controls are inadequate or non-functional e.g. emergency spill situations. Users must be registered in the University of Guelph Respirator program and appropriately trained and fitted prior to using a respirator. Fit-testing is required for all respirators and is provided by EHS. Contact the Occupational Hygienist at x54855 for more information.

Disposable dust masks are to be used when nuisance quantities of non-toxic dust are generated from material(s) being used.

For situations where the air contains unacceptable or unknown concentrations of vapours or fine air-borne particles, a respirator may be required. These respirators are to be chosen and maintained with appropriate fit-testing and monitoring as required in Policy 851.05.06.

Respirators are to be stored such that they do not accumulate dust, i.e. in a drawer or box that allows sufficient ventilation to prevent growth of bacteria or mold. Respirators should be labelled with the name of the user. When being used, detection of an odour confirms that the respirator is either not providing a good fit or that the filter cartridges have expired. However, odour must not be primarily relied on to provide warning; Hydrogen sulfide causes olfactory fatigue and the odour vanishes but the hazard remains present.

8.3.1.5. Hearing Protection

Hearing protection must be worn in areas where the 8-hour time-weighted average noise level is greater than 85 dB. Noise monitoring can be performed by EHS personnel if required. Hearing protection may consist of ear plugs or ear muffs depending on the amplitude and frequency of the noise.

8.3.1.6. Foot Protection

Appropriate foot protection must be worn if exposure to foot injuries is possible. Closed-toed, closed-heeled shoes constructed of a resistant material (preferably leather) are required while in all laboratory areas. Sandals do not provide adequate protection and are not to be worn in any laboratory situation. High-heeled shoes are strongly discouraged as they increase the potential for tripping or falling.

Steel-toed, chemical resistant safety shoes may be warranted in specific cases as determined by the laboratory supervisor. For regular full-time employees, upon submission of a receipt for CSA approved safety footwear, the University shall provide once annually with no carry-over provision, a safety shoe subsidy in the amount of $150.00 for the purchase of safety shoes.

8.3.1.7. Head Protection

Head protection is required when working where there is a risk of injury from moving, falling, or flying objects or when working near high-voltage equipment. Hard hats (or bump hats) are designed to protect from the impact and penetration caused by objects hitting the head. Head protection should be chosen according to the hazard and should be properly rated.

8.3.2. Unattended Procedures

Unattended experiments should not involve the use or production of toxic or biohazardous substances, flammables solvents, highly explosive vapours or gases, the use of high pressures and/or temperatures, or the use of high levels of radioactivity which may be subject released off equipment.

Experiments which are to be left unattended and which involve temporary connections to building water or steam supplies are to:

1. Use tubing in good condition.
2. Have all water hoses wired or clamped shut at connecting points.
3. Use water lines equipped with a valve or other flow restrictor located immediately next to the main supply line.

If possible, all steam, water and gas lines should be equipped with automatic safety shut-offs which are activated in the event of electrical power failure to the system.

An obvious notice must be placed on the equipment used for unattended experiments. This notice will provide the following information:

1. The name, UoG extension and home telephone number of the researcher who is using the experiment
2. The name, UoG extension and home telephone number of the researcher's advisor.

3. A list of all potentially hazardous chemicals or biological agents contained in the experimental system.
4. The time the experiment was started and the expected time of completion.

8.3.3. Guidelines for Working Alone

You are never to work alone in a laboratory if the research involves activities which may be hazardous or potentially hazardous to a significant degree. For example: use of large quantities of flammable liquid (i.e. more than 2L) or smaller amount of flammable liquids contained in an apparatus at elevated temperatures and pressure; toxic gases, liquids or solids; high-pressure systems; moving equipment and machinery that does not have guards on moving parts; cold rooms.

8.3.3.1. Faculty, Graduate Students and Research Employees

Faculty, graduate students and research employees may work alone, subject to the general guidelines above and the completion of a safety assessment report. The following precautions are recommended also:

1. Persons should work alone only if there is a minimal potential for a serious accident to occur, which might render the researcher helpless to call for assistance.
2. The researcher's presence in the laboratory must be known to a second person, preferably on-campus, who may be directly contacted by telephone. Alternatively the researcher may make arrangements with the campus police (x2000) for periodic contacts. The researcher should contact the 2nd person hourly at a pre-arranged time. The second person is expected to check on the lone worker immediately should contact at the agreed upon time not be made.

If a doubt exists as to whether a job meets the suggested guidelines for working alone, the researcher, supervisor and lab supervisor should jointly assess the situation and reach a mutually agreeable decision.

8.3.3.2. Undergraduate Research Students

This includes all undergraduate students involved with research pertaining to degree requirements, those who receive Research Assistantships or scholarships. To perform experimental research work in a laboratory, an undergraduate student must have prior authorization from his/her instructor. The granting of this authorization is dependent on the submission by the undergraduate student of an acceptable work plan and of an acceptable Safety Assessment form. Normally an undergraduate student should not be permitted to work alone in a laboratory on experimental research for the fulfillment of course requirements.

9) Chemical Safety

- Know the hazards of the materials with which you are working. Review the MSDS prior to handling a new chemical.
- Don't accumulate unnecessary inventory – check to see if your lab already has the chemical, and order only as much as you need.

- Never store incompatible materials together. Acids cannot be stored with bases; flammables cannot be stored with oxidizers.
- Never put flammable solvents in a fridge unless the fridge is specifically designed to accommodate flammables.

9.1. Exposure Methods

Before a hazardous material can cause a health effect it must enter the body. There are four primary routes of exposure: 1) inhalation; 2) absorption; 3) ingestion; and 4) injection.

Inhalation

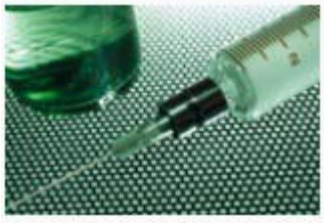
Inhalation is the most common route of entry for occupational exposure to a hazardous material. Materials in the form of gases, mists, dusts or fumes can mix with air and be inhaled. Once in the lings, materials may be passed into the blood, stimulate an immune response in the lungs (e.g. mucous production), damage the lung tissue, or be exhaled.

Absorption

Our skin is a primary barrier against hazardous materials and is quite effective against aqueous (water-based) materials. However some chemicals can penetrate this layer. Hazardous materials can also enter the body through cuts, or scrapes in the skin. Materials may also enter the body through the eyes. Absorption is the second most common route of entry in occupational exposures.

Ingestion

Workplace exposures through intentional ingestion is rare, however food or drink can become contaminated and result in hazardous materials being introduced into the digestive system.



Injection

Hazardous materials may be introduced directly into the blood stream or muscular tissue through contact with needles or other sharp objects that can pierce the skin barrier.

9.2. Chemical Storage and Transport

The storage and transportation of chemicals can be just as important in preventing a hazard as using them in an experiment. Some chemicals absolutely cannot be stored together, as well, some cannot be stored in certain places that may be safe for others.

9.2.1. General Chemical Storage and Transportation Information

Storage tips:

1) Chemical storage should be organized by hazard class, not alphabetically nor order date etc. Refer to Material Safety Data Sheets for storage directions if unsure. Direct any questions concerning chemical storage to the lab supervisor or lab instructor.
2) Hazardous chemicals should be stored in an area that is only accessible to authorized laboratory workers.
3) Keep glass containers off the floor, away from possible collisions with people and equipment.
4) Store chemicals away from sources of heat or direct sunlight.
5) Store containers of liquids inside secondary containers (such as trays or tubs) if possible.
6) Do not store hazardous liquids or large objects on shelves above eye level.
7) Install edge guards on all open shelves used for chemical storage.
8) Use sturdy shelves whose load capacities exceed that of the chemicals stored on them: regularly inspect clamps, supports, shelf brackets and other shelving hardware.
9) Maintain labels; checl storage areas weekly for faded, missing or loose labels.
10) Dispose of unwanted chemicals promptly.
11) Keep inventory records of chemicals updated and accurate.

Transportation tips:

1) Chemicals that are carried by hand should be placed in a carrying container or acid-carrying bucket in order to protect against breakage and/or spilling.
2) When transporting chemicals on a wheeled cart, the following precautions should be taken:
   a) Be sure the cart is stable under the load.
   b) Wheels should be large enough to roll over uneven surfaces without tipping or stopping suddenly.
3) For the safe transport of small quantities of flammable liquids:
   a) Use rugged, pressure resistant, non-venting containers.
   b) Store in well ventilated vehicle during transport, there is a University policy on vehicular transport of hazardous materials.
   c) Eliminate potential ignition sources.
4) Chemicals should not be carried in open containers in hallways or elevators where they may be spilled.

9.2.2. Transportation of Dangerous Good (TDG)

Anyone who ships carries or receives dangerous goods must have a valid training certificate. Anyone requiring TDG training should contact EHS at x53282.

The University's College of Biological Science has an online Standard Operating Procedure for TDG at: http://www.uoguelph.ca/cbs/safety/cbs_ehs_procedures.shtml. Instructions on training requirement, packaging design, labelling, and documentation can be found here.

9.2.3. Fume Hoods

When a hood is not in use, keep the sash fully closed. This is a simple thing that can conserve a lot of energy – fume hoods exhaust a large volume of air when they are open, and it requires a great deal of energy to heat or cool the replacement air.

When working in a fume hood, keep the sash as low as you reasonably can. This improves ability of the hood to keep airborne contaminants out of your breathing space, offers some protection to your face should there be a splash or spill, and conserves energy.

Fume hoods on campus are equipped with a warning device that will alarm when the airflow is inadequate for the hood to function as designed. The alarm will go off if the airflows falls below a pre-set threshold (face velocity of 80 feet per minute). Do not attempt to use the hood if the alarm is going off and stop any experiments taking place inside the hood if the alarm persists. Close the sash fully to prevent hazardous vapours from migrating into the lab.

To determine if low flow may be resulting from a disruption of airflow, remove items that may be obstructing the movement of air through the vents at the back of the hood. Also, lower the sash and reset the alarm if possible. Sash position will affect the face velocity, which is an important factor in effective capture of airborne contaminants. Baffles should not be adjusted by users.

Large disruptions in the air around a hood (e.g., the opening/closing of a door) may temporarily affect the airflow through the hood if this is suspected as the cause of the problem; try resetting the alarm if possible. If the above changes do not rectify the issue, label the hood as `out of order' and notify Physical Resources (x53854) or the appropriate departmental contact for equipment problems.

- Keep sash closed when not in use
- Ensure that the fume hood is on prior to use
- Work with sash as low as possible (less than 18"/50cm)
- Keep all work at least 6"/15cm back from front edge
- Do not obstruct air vents at rear of hood
- Do not allow hoods to become cluttered or to be used as extra storage
- Uncap containers inside the hood, recap them as soon as you are finished
- Do not use a fume hood if the alarm indicates low flow
- Any solution of perchloric acid above 70% being heated must be handled in a specially designed hood with wash-down features
- Completely close the sash if you are working in a hood when the fire alarm goes off

9.3. Compressed Gas Cylinders

9.3.1. Safety Precautions

Compressed gas cylinders expose users to both chemical and physical hazards. The gases contained in these cylinders can be toxic, flammable, oxidizing, corrosive, inert or some combination thereof. Since the chemicals contained in these cylinders are in gaseous form and are pressurized, they can quickly contaminate a large are due to leaks in the cylinder. For this reason, it is necessary to be familiar with the chemical hazards of the gases being used. In addition to the chemical hazards of the gases contained in the cylinders, there are also physical hazards involved from the pressures of the gas as well as the physical weight of the cylinders. Broken cylinders will result in shrapnel, valves snapped off make a rocket out of cylinders, liquid contents will vaporise resulting in large and rapid temperature drop which can freeze exposed flesh.

9.3.2. Usage

1. Only properly trained individuals should handle compressed gas cylinders
2. Back off the pressure adjusting screw of the regulator to release spring force before opening the cylinder valve.
3. Open the valve slowly and only with the proper regulator in place. Stand with the cylinder between yourself and the regulator (cylinder valve outlet facing away).
4. Always use the appropriate regulator for the gas being used. The regulator should be inspected each time before use (for grease, oil, dirt and solvent), as recommended by the manufacturer. Do not rely upon the pressure gauge to indicate the maximum pressure ratings; check the regulator's specifications.
5. Never use grease or oil to lubricate regulators or cylinder valves because they can cause an explosion.
6. The cylinder should be placed so that the valve handle at the top is easily accessible.
7. When using toxic or irritating gas, the valve should only be opened while the cylinder is in a working fume hood.
8. Only use wrenches or tools that are provided by the cylinder supplier to open or close a valve. Pliers must never be used to open a cylinder valve. Some regulators require washers; this should be checked before the regulator is fitted.
9. Fire extinguishing equipment should be readily available when combustible materials can be exposed to welding or cutting operations using compressed cylinder gases.
10. Keep the cylinder clear of all electrical circuits, flames, and sparks.
11. Never leave the valve open when equipment is not in use, even when empty, air and moisture may diffuse through an open valve, causing contamination and corrosion within the cylinder.
12. Do not force connections that do not fit.
13. Never bleed a cylinder completely empty, leave a residual pressure.

9.3.3. Storage and Transportation

Storage:

1. All gas cylinders, empty or full, must be properly secured so they cannot be knocked over. Cylinders with safety caps in place may be secured together. All others must be secured separately (Ontario Regulation 851 Section 49 – b).
2. Use appropriate material, such as a chain, plastic coated wire cable, commercial straps etc., to secure cylinders.
3. Gas cylinders cannot be stored in public hallways, or other unprotected areas.
4. Cylinders must be segregated in hazard classes while in storage. Oxidizers (oxygen) must be separated from flammable gases, and empty cylinders must be isolated from filled cylinders.
5. Store out of direct sunlight and away from sources of heat and ignition; temperatures must not exceed 51°C (125 °F).
6. Always place valve protectors on gas cylinders when the cylinders are not connected for use.
7. Cylinders must be protected from damage. Do not store cylinders near elevators or gangways, or in locations where heavy-moving objects may strike or fall on them.
8. Cylinders should be protected against tampering by unauthorized individuals.
9. Storage areas must be well-ventilated, cool, dry, and free from corrosive materials.

Transportation:

1. Compressed gas cylinders should be transported with protective cap and chained on appropriate carts. Never drag or roll a compressed gas cylinder.
2. Cylinders should never be transported with the regulator in place.
3. Be careful not to drop cylinders or strike them against each other or against other surfaces violently.
4. Never use the valve cover to lift cylinders; they could be damaged and become unattached. If the cylinder is dropped on a hard surface it can cause an explosion.

9.3.4. Cryogenics (Liquefied Gases)

- Always wear gloves and eye protection when handling liquefied gases.
- Keep the door open when dispensing from bulk storage dewars.
- If you have a spill, the only thing you can do is evacuate immediately. Make sure everyone gets out of the immediate area, and wait 30 minutes for the air to clear. If a spill is >4L, call EHS, as air testing may be required to verify the oxygen level has returned to normal.

Some storage areas for dewars are equipped with an oxygen monitor. When the alarm sounds, close any open valves immediately and leave the room.

10. Biosafety

The Biosafety Program focuses on regulatory and contractual compliance issues involving the receipt, use, storage, shipment and disposal of biohazardous materials at the University. Biohazardous materials include infectious agents, (i.e., pathogens), or materials produced by living organisms, (i.e., biological toxins), which may cause disease in other living organisms. Recombinant DNA is also encompassed by this policy.

10.1. Risk Groups and Containment Levels

Risk groups are a system of classification of infective micro-organisms by severity of individual and community risk. Risk group 1 (RG-1) presents the least risk and Risk Group 4 (RG-4) presents the most risk. Factors for assigning risk groups include pathogenicity, infectious dose, mode of transmission, host range, preventative measures available and the effectiveness of available treatments. Risk groups are not to be confused with Containment Levels.

A containment classification based on level of risk or hazard to be encountered while handling biohazardous material. There are four levels of containment based on the Public Health Agency of Canada Laboratory Biosafety Guidelines. Containment Level 1 (CL-1) has the least level of risk; Containment level 4 (CL-4) has the highest level of risk.

The containment level and risk group of the pathogen are generally the same (e.g., RG-2 pathogens are handled at CL-2), but there are some exceptions.

10.2. Human Pathogens and Toxins Act

Over the past decade, many countries have developed more stringent controls over the possession, containment and movement of pathogens into and within their borders. In Canada, while imported human pathogens and toxins are subject to the Human Pathogens Importation Regulations (HPIR), there have been no comprehensive nationally consistent controls for non-imported human pathogens and toxins. As a result, there are no nationally consistent safety requirements (e.g. no comprehensive inventory of who has what pathogen and in what quantity, nor knowledge of how safely they are being handled).

To address the concerns above, Parliament passed the Human Pathogens and Toxins Act (HPTA) in 2009. The purpose of this Act is to establish a safety and security regime to protect the health and safety of the public against the risks posed by human pathogens and toxins.

10.2.1. Pathogens (Schedules 2-4 and Part 2 of Schedule 5)

A human pathogen means a micro-organism, nucleic acid or protein that is listed in any of Schedules 2 to 4 or in Part 2 of Schedule 5 or is not listed in any of the Schedules but falls into RG-2, RG-3 or RG-4.

Schedule 2 is comprised of bacteria, viruses, fungi, protozoa, and prions deemed to be Risk Group 2 human pathogens. Schedule 3 is similarly comprised of Risk Group 3 human pathogens. Schedule 4 details the most dangerous human pathogens that are Risk Group 4 human pathogens such as the Ebola virus and Herpes B virus. Currently, there is only one virus listed in Schedule 5 which is prohibited human pathogens and toxins; this virus is Variola virus commonly known as Smallpox.

10.2.2. Toxins (Schedule 1 and Part 1 of Schedule 5)

Toxins can be small molecules, peptides, or proteins that are capable of causing disease on contact or by absorption by body tissues interacting with biological macromolecules such as enzymes or cellular receptors. Toxins are poisonous substances produced within living cells or organisms; man-made substances created by artificial processes are thus excluded. Toxins vary greatly in their severity, ranging

from usually minor and acute (e.g., bee sting, insect bites) to almost immediately deadly (botulinum toxin).

Schedule 1 outlines the toxins listed in the Human Pathogens and Toxins Act. Toxins are generally not as dangerous to the community since they are easier to control from spreading. Toxins do not replicate, are not infectious, and are not transmitted from person to person.

There are currently no known prohibited toxins in Part 1 of Schedule 5.

10.3. Permits

A valid biosafety permit, issued by the University of Guelph Biosafety Committee, must be obtained for all activities involving use or storage of biohazardous materials. For more details, please refer to the information provided on: https://www.uoguelph.ca/hr/hr-services-environmental-health-safety-programs/biosafety.

10.4. Import of Pathogens

In order to bring pathogenic agents into Canada, one of, or both, the Public Health Agency of Canada (PHAC) and the Canadian Food Inspection Agency (CFIA) must approve the importation. In some cases we must obtain the permits ourselves, in other cases we import under the permiet of a supplier or distributor. The flowcharts below depict the process for importation of risk group 2 materials for circumstances where the supplier is the permit holder, and for situations where the PI applies for the import permit.

Figure 2 - Supplier as Import Permit Holder

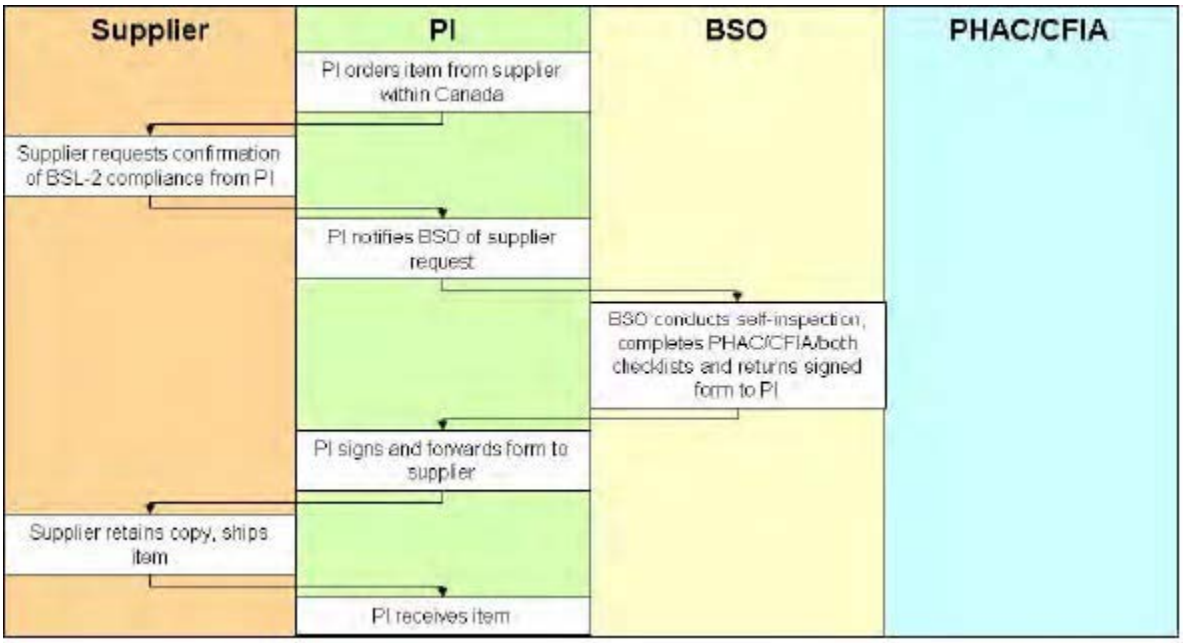
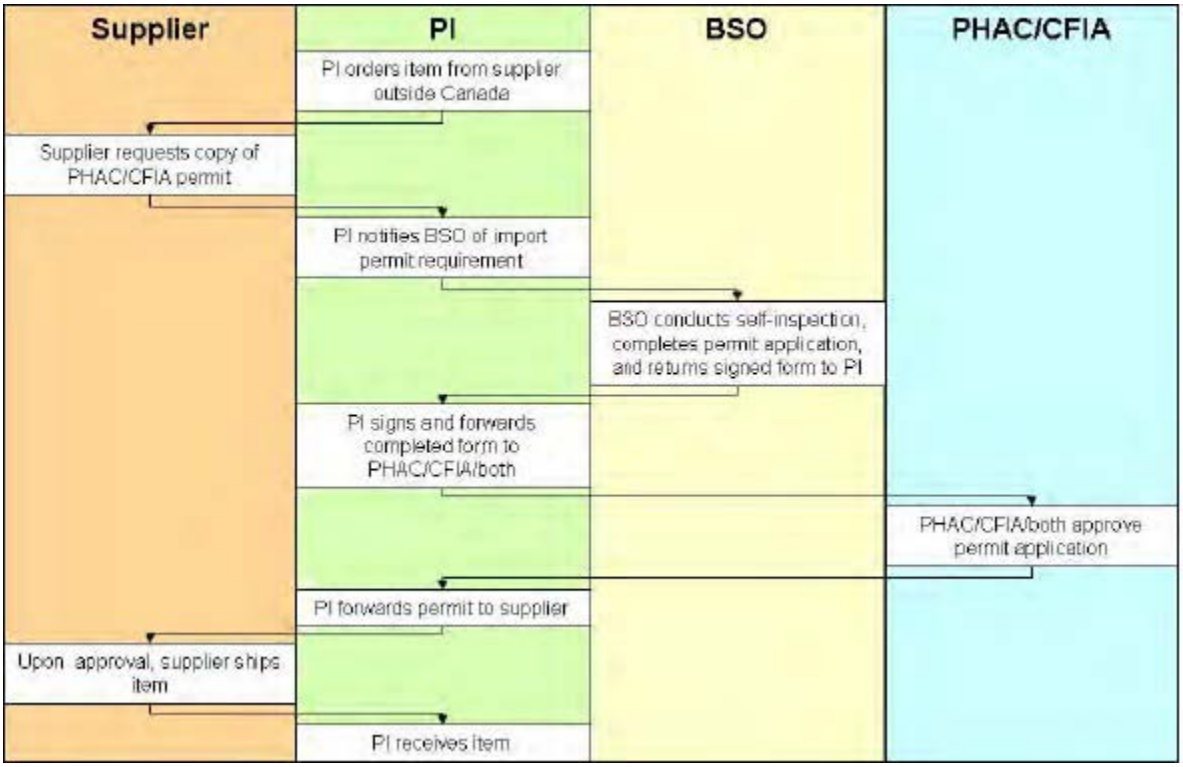


Figure 3 - Principal Investigator as Import Permit Holder



10.5. Material Transfer

Before we release biohazardous materials to another individual, organization or institution, it is incumbent on us to take reasonable steps to ensure that the material will be handled properly.

For materials that fall into Risk Group 2 (or higher), we must ensure the destination facility fulfills all requirement of a Containment Level 2 laboratory, as described in the PHAC and/or CFIA guidelines. As well, shipments of risk group 2 or higher materials may fall under the Transportation of Dangerous Goods (TDG) described in section 9.2.2.

10.6. Biosecurity

In recent years the level of concern over the security of pathogenic materials has grown. From the perspective of the end user, the key points surround access and inventory control.

Access control is an important aspect of biosecurity. Never prop open doors or tamper with locking mechanisms, and please report an suspicious activities or behaviour. Generally speaking, doors can be unlocked during the day when the lab is occupied, but after hours lab doors must be securely closed and locked.

To facilitate proper inventory control, make sure you keep your materials well organized, properly labeled, and accounted for using the inventory system in your lab. If freezers or storage rooms are kept locked, be sure to relock them when you are finished using them. Dispose of biological wastes properly so that pathogens are effectively destroyed.

10.7. Operational Requirements

The purpose of the various requirements are to keep you, as a worker, from being exposed; to prevent contamination from being carried out of the lab and to spread to other parts of our facilities; and to put plans in place to deal with emergencies that may arise.

A few of the essential operational requirements for Containment Level 2 (many of which are applicable in all labs) are listed below:

- All personnel must wear fastened lab coats when working in the lab. Lab coats are not to be worn in stairwells or common areas of the building. Contaminated lab coats should be autoclaved or chemically disinfected prior to laundering (unless laundry has been proven to effectively decontaminate lab coats).
- Eye or face protection is required whenever there is a risk of splashes, aerosols or flying objects.
- Closed toed shoes are required when working in all laboratories, including Containment Level 2 areas.
- Gloves must be worn whenever there is a potential for skin contact with a biohazard, and removed prior to leaving the work area. Any cuts or scrapes must remain covered at all times with a waterproof dressing. Hands should be washed whenever gloves are removed, and prior to leaving a laboratory.
- To prevent accidental contamination, long hair must be tied back and lab coats must be worn by all personnel when working in the lab. Jewelry is not recommended.
- To reduce the probability of ingestion, food, drink and cosmetics are not permitted in the lab. Oral pipetting is prohibited.
- Routine chemical disinfection of work surfaces is necessary to prevent the spread of potentially pathogenic material, and non-essential items and personal belongings must be kept away from areas where biohazards are handled. Benchkote should be changed on a regular basis and following any minor spills.
- All biohazardous waste materials must be decontaminated (i.e. autoclaved) prior to disposal or collected by a disposal company specializing in the handling of biohazardous waste.

10.8. Biosafety Cabinets (BSC)

- Any time your work requires use of the BSC, you should wear a lab coat and gloves to protect your skin and your clothing from contamination. As well, long hair should be tired back.
- Plan your work and minimize movement in and out of the hood.
- Chemically disinfect before and after use.
- Allow time for air current to stabilize before starting work in the cabinet.

11. Radiation Safety

11.1. Permits

All radioactive materials must be ordered through the Radiation Safety Officer and may only be handled by laboratories that have a permit granted by the campus Radiation Safety Committee.

At the University of Guelph, we have Basic Level Laboratories (BLL) and Intermediate Level Laboratories (ILL). The open quantity of a radioisotope in a BLL is limited to less than 5 times the Annual Limit on intake.

In addition to quantity limitations within permitted labs, there are extensive requirements for inventory tracking, use of shielding devices and exposure controls, monitoring of exposure and contamination, and management of waste. These topics are covered in detail as part of the Radiation Safety Training, and documented in the Radiation Safety Operational Guidance (RSOG) documents. More information is available on the EHS website at: https://www.uoguelph.ca/hr/hr-services-environmental-health-safety-programs/radiation-safety.

11.2. Requirements

Prior to any work with radioactive materials, staff and students must successfully complete Radiation Safety Training. The core set of RSOG documents are available to users in permitted labs, and treated as the primary reference for operational guidance (along with the specific protocols followed in your individual lab).

During experiments, in most circumstances it will be appropriate to have a survey meter on hand to periodically sweep the work area, verifying that contamination has been effectively controlled. As well, post-experiment wipe-testing and dosimeter use must be performed to confirm the work area is adequately free from radioactive material.

12. Laboratory Waste Disposal

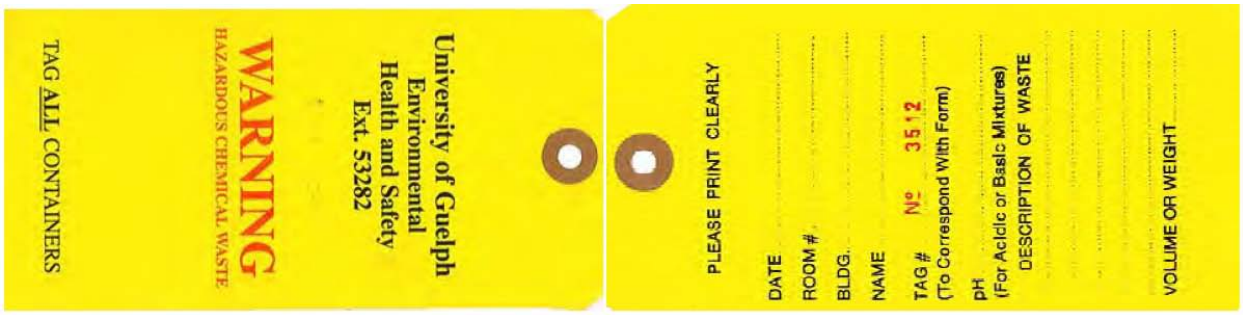
12.1. General Waste Information

Placing hazardous waste in the normal garbage can put the safety of the custodial staff at risk, and leads to serious fines and penalties to the University. The pouring of chemicals down the drain is incredibly irresponsible, damaging to the environment, and is prohibited by law.

If you are unsure of how a certain chemical or material might be classified as a waste, hand on to it and ask for clarification from your supervisor, or the Laboratory Safety Officer in the EHS department.

Hazardous Waste tags, like the one shown below are available from the EHS Department. You may call x53282 and ask the Administrative Assistant to send you a supply of tags through interoffice mail. Affix a tag to the waste container when you begin collecting waste.

Figure 4 - Hazardous Chemical Waste Tag



12.2. Waste Classification and Disposal Procedure

Table 4 - Waste Disposal Procedure Chart

Waste Type	Examples	Disposal Procedure
Regular, non-hazardous garbage	Paper towel, gloves	Place in garbage container (black bag).
Recyclable materials (not contaminated with hazardous materials)	Fine paper, newspaper	Place in blue bin (clear bag).
Aqueous solutions	Phosphate buffer Tris buffer	Aqueous solutions that contain any hazardous materials (metals, dyes, stains) must be collected and disposed of as hazardous waste. If a solution is a mixture of aqueous and organic solvents, treat as either halogenated or non-halogenated solvent. NOTE – if solutions are strongly acidic or basic, label and separate. Do not mix acids and bases in waste jugs.
Halogenated organic solvent waste	Chloroform, methylene chloride	Collect in either a safety can or an empty 4L bottle. Safety cans will be returned within a week of pick-up. If using a safety can, label to indicate the type of waste. Keep lid closed except when filling, and store in flammable storage cabinet. If using a 4L bottle, ensure it either contained a compatible chemical or has been cleaned of any residue. The original label must be defaced or removed, and the bottle must be labeled indicating the type of waste it contains. Store in the flammable storage cabinet.
Non-halogenated organic solvent waste	Acetone, ethanol, isopropanol	Collect in either a safety can or an empty 4L bottle. If using a safety can, label to indicate the type of waste. Keep lid closed except when filling, and store in

		flammable storage cabinet. If using a 4L bottle, ensure it either contained a compatible chemical or has been cleaned of any residue. The original label must be defaced or removed, and the bottle must be labeled to indicate the type of waste. Store in the flammable storage cabinet.
Biohazardous waste	Used culture plates/tubes/flasks, disposable pipettes	Collect in an autoclavable bag (typically orange or red). Regularly (e.g. daily) close the top of the bag and use a cart to take it to the waste autoclave. Don't pack waste in tightly; penetration of the steam is imperative for effective decontamination. Note – in departments/areas where suitable autoclaves are not available, a specialized waste contractor can be contracted to regularly pick up collected biohazard waste. Contact EHS to intitiate this type of agreement with a contractor in this area.
Biohazardous sharps	Syringes, blades, contaminated broken glass or other sharp object potentially contaminated with a biohazardous material	
Clean Glass Waste	Clean glassware, glass pipettes	
Radioactive waste	C_{14}, P_{32}	
Expired/Unneeded chemicals	Expired dry or liquid chemicals, chemicals that are no longer used	
Compressed gas tanks	Empty N_2 cylinder	
Formaldehyde	Formalin preservative	
Ethidium bromide waste	Stock solutions	
Acrylamide	Stock solutions, polymerized gels	

Section 4. Lab Personnel Checklist

Within this section you will find a highlight of personnel responsibilities. Note that the term “lab personnel” is intended to include all people working or studying with the lab and includes staff, students, visiting scientists, post docs and volunteers.

Supervisor Checklist

HAVE YOU:

- ☑ Completed Competent Supervisor and Due Diligence training.
- ☑ Identified suitable, alternate supervisors for your lab, obtained their acknowledgement and completed a Lab Contacts form.
- ☑ Provided the departmental/institute administrative assistant with a copy of the Lab Contacts form and filed a copy in this binder.
- ☑ Posted emergency response/spill posters.
- ☑ Posted MSDS access instructions.
- ☑ Posted self inspection checklist.
- ☑ Completed self inspections as scheduled.
- ☑ Provided lab contact information including identification of a designate in your absence.
- ☑ Ensured lab personnel have been provided a general orientation to the lab and completed a Safety Orientation Record for all lab personnel.
- ☑ Provided the departmental/institute administrative assistant with a copy of the Safety Orientation record for lab personnel and filed a copy in this binder.
- ☑ Ensured lab personnel have completed required safety training as per SoE guidelines.
- ☑ Created and updated Ongoing Safety Training Record for all lab personnel and filed the form in this binder.

Lab Personnel Checklist

HAVE YOU:

☑ Completed required safety training

- WHMIS
- Lab Safety
- Biosafety
- Others as required

☑ Completed a Safety Orientation Record that has been submitted to the department with a copy filed in this binder.

☑ Completed training on specific pieces of equipment that you will be using e.g. centrifuges, autoclaves, etc.

☑ Created an Ongoing Safety Training record that is filed in this binder.

☑ Ensured that you can access MSDSs and reviewed the MSDSs for the hazardous materials with which you will be working.

☑ Reviewed the emergency procedures for the lab and the locations of emergency equipment.

☑ Reviewed the SoE Safety manual (included in Section 6).

☑ Provided lab contact information including identification of a designate in your absence.

☑ Reviewed the Campus and Lab Contact information (included in Section 1).

Visited the EHS website at ***www.uoguelph.ca/ehs***

Section 5. Training Records

This section contains the SoE training matrix which illustrates the general safety training requirements for different roles within the school.

As well within this section completed safety training records are to be filed. This includes the following for all lab personnel:

- **Safety Orientation Records** – copy of this record also to be submitted to the departmental/institute Administrative Assistant
- **Ongoing Safety Training Records**

Samples of each of these forms are included for convenience.

These files are to be made available to the Local Joint Health and Safety Committee for review during workplace inspections.

All personnel using the laboratory must be entered on this sheet. Equipment listed requires training - the authorized instructor must initial that the training was done. An authorized user must give a tour of the lab to new users showing locations for safety binderes, PPE, Spill Kits, fire extinguishers, WHMIS Binders and safety posters. Additional SOP's and training forms will be available here.						
Autorized Lab Personnel						
WHMIS						
Lab Safety						
Biosafety						
Due Diligence						
Lab Safety Tour						
Additional Lab Specific Training						

All personnel using the laboratory must be entered on this sheet. Equipment listed requires training - the authorized instructor must initial that the training was done. An authorized user must give a tour of the lab to new users showing locations for safety binderes, PPE, Spill Kits, fire extinguishers, WHMIS Binders and safety posters. Additional SOP's and training forms will be available here.						
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Lab Safety						
Biosafety						
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Autorized Lab Personnel						
WHMIS						
Lab Safety						
Biosafety						
Due Diligence						
Lab Safety Tour						
Additional Lab Specific Training						

Section 6. Forms

The section includes:

Samples of relevant safety related forms such as

- Field research Safety Plan
- Field Trip
- Incident Report
- Lab Access
- Radioactive Waste Request
- Surplus Chemical and Waste Request
- Volunteer Waiver

Note that current version of these forms are available on the EHS website at:
http://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

LAB ACCESS FORM

SCHOOL OF ENGINEERING

University of Guelph

Semester: Winter _____ Summer_____ Fall _____ Year _____

This form and a Lab Work Outline must be completed before ANYONE can begin to work in a lab other than a computer lab. Once the above is completed and accepted, your access card or FOB will be enabled for the required labs or a key will be provided. This form must be completed at the beginning of each semester if you intend to continue to work in a lab. Failure to do so will result in the loss of lab access and or computer privileges. Completed forms are to be submitted to Philip Watson in Room 1175 located in the machine shop. Keep a copy for your records and give one to your supervisor/advisor.

Title of Project: _____ Lab Room #: _____

Are you currently working in a lab?	Yes ____	No ____
Have you completed the U of G WHMIS training?	Yes ____	No ____
Have you completed the U of G "Lab Safety" course?	Yes ____	No ____
Is your project a Biohazard?	Yes ____	No ____

If yes to above:

What is the Biohazard permit number for the project? _____

Have you completed the U of G "Introduction to Biosafety" course? Yes ____ No ____

LAB WORK OUTLINE

The outline should be around one page in length and must be submitted once with your first Lab Access form and again when there is a change to the work being done. The outline briefly describes the work being done and identifies the equipment and chemicals being used. It outlines the anticipated hazards and identifies the steps taken to reduce the hazards of the work. It indicates what you will do in case of an emergency. It is not an exam so consultation with your advisor/supervisor is encouraged. The outline or amended outline must be signed by your Advisor and the Lab Technician.

In signing this form, I indicate that I have read the appropriate documents including MSDS, the University of Guelph Laboratory Safety Manual, and other applicable safety standards and that I have discussed the safety aspects of my project with my advisor. Further, I indicate that I understand the hazards of my workplace and agree to work in a safe manner.

Researcher: Name _____ Signature _____ Date_____

In signing this form, I indicate that I have reviewed the researcher's original or amended Lab Work Outline and have found it satisfactory. I have discussed the safety aspects of the project with the researcher and I believe the researcher understands and the hazards of his/her workplace sufficiently to work safely. Further, I acknowledge that I have the ultimate responsibility for the safety of this project.

Supervisor/Advisor: Name _____ Signature _____ Date_____

In signing this form, I indicate that I also have reviewed the researcher's original or amended Lab Work Outline and have found it satisfactory. I have discussed the safety aspects of the project with the researcher.

Lab Technician: Name _____ Signature _____ Date_____

UNIVERSITY of GUELPH

ILLNESS or INJURY INCIDENT REPORT

This form must be initiated and faxed within 24 hours of the Supervisor learning of the incident.
Fax to 519-780-1796 Submit additional information as available.

❑ Injury	❑ No Injury
❑ First Aid ❑ No First Aid ❑ Health Care (Medical Aid)	❑ Hazardous Situation

THIS SECTION TO BE COMPLETED BY OR FOR THE AFFECTED PARTY

Who was the affected Person: ❑ EMPLOYEE ❑ STUDENT ❑ VISITOR ❑ VOLUNTEER ❑ CONTRACTOR	**Last Name:**	**First Name:**	**Initial:**	**Phone or Extension:**
	Occupation, if applicable:	**Department:**	**Union/Bargaining Group:**	
	Name of Supervisor:	**Phone or Extension:**	**Name of Dept Head:**	
	Date & Time of Incident:	**Date Reported to Supervisor:**	**Date Submitted:**	

❑ Slip, Trip or Fall
❑ Electrical Shock/Burn
❑ Needle/Sharp/Puncture/Cut
❑ Loss of Consciousness
❑ Struck by/against Object
❑ Exposure to possible hazardous/infectious material
❑ Animal Bite/Sting/Scratch
❑ Muscle Strain
❑ Repetitive Strain
❑ Violence
❑ Harassment
❑ Submit secondary violence or harassment form
❑ Other

If Slip or Fall describe footwear:

Description of Incident:

Witnesses (Name/Phone Number):

Where did the incident occur?	❑ Guelph Campus ❑ Alfred Campus ❑ Kemptville Campus ❑ Ridgetown Campus ❑ Research Station: Other:	**Building Name:**	**Room #:**

❑ Cafeteria ❑ Classroom ❑ Hallway ❑ Kitchen ❑ Lab ❑ Stairwell ❑ Office ❑ Washroom ❑ In Vehicle ❑ Stairs
❑ Loading Dock ❑ Parking Lot ❑ Walkway ❑ Other

What was the Injury:

Select part of body and Indicate Right (R) Left (L) or Both (B) or Quantity Injured in the box:

❑ Head		❑ Teeth		❑ Pelvis		❑ Elbow		❑ Upper Back		❑ Knee		❑ Toe	
❑ Face		❑ Neck		❑ Shoulder		❑ Wrist		❑ Lower Back		❑ Lower Leg			
❑ Eye		❑ Abdomen		❑ Upper Arm		❑ Hand		❑ Hip		❑ Ankle			
❑ Ear		❑ Chest		❑ Lower Arm		❑ Fingers		❑ Upper Leg		❑ Foot			

Did you see a medical professional?
❑ No ❑ Yes **If yes, Date of Visit:**

If yes, Name, Address and Phone Number of Medical Professional:

Treatment of Injury:

❑ Occ Health / Dept First Aid
❑ Physician /Clinic
❑ Student Health Services
❑ Emergency Room
❑ No First Aid Req'd

THIS SECTION TO BE COMPLETED WITH OR BY THE SUPERVISOR

Contributing Factors: What conditions contributed to the incident?

- ❑ Operating W/O Authority
- ❑ Inadequate Work Procedure
- ❑ Failure to Lockout
- ❑ Insufficient Training
- ❑ Unsafe Equipment
- ❑ Inadequate Housekeeping
- ❑ Improper Position/Posture
- ❑ Inadequate Illumination
- ❑ Infraction OR Unsafe Practice
- ❑ Failure of Personal Protective Equipment
- ❑ Not or Improperly Guarded
- ❑ Hazardous Environmental Condition
- ❑ Inclement Weather
- ❑ Other

Explanation of Contributing Factors:

Details of Property Damage (if any):

To your knowledge, has the employee reported a previous similar injury or similar hazardous situation before?

❑ No ❑ Yes

Corrective Measures: Actions taken to prevent a reoccurrence (Check all that apply):

- ❑ Control Operation/Access
- ❑ Improve Work Procedure
- ❑ Apply Lockout/Tagout
- ❑ Provide Training
- ❑ Repair/Replace Equipment
- ❑ Perform Housekeeping
- ❑ Ergonomic Assessment
- ❑ Job Safety Analysis
- ❑ Request Lighting Review
- ❑ Reinstruction of Persons Involved
- ❑ Review Personal Protective Equipment
- ❑ Install Safety Guard/Device
- ❑ Inform Dept Supervision
- ❑ Inform all Staff
- ❑ Other

Explanation of Corrective Measures:

Signature of Person Reporting Incident **Supervisor Signature** **Dept Head Signature**

After faxing, distribute copies to: ❑ Dept Head ❑Union/Bargaining Group ❑Local JHSC

Description of Incident continued:

❑ Continued on Attachment

Purpose of the Incident Report Form

- To ensure compliance with the Workplace Safety and Insurance Board and the Occupational Health and Safety Act, which require timely reporting of occupational injury or disease.
- Information requested on this form will be used by Occupational Health and Wellness (OHW) for the completion of the required WSIB Form 7 and by Environmental Health and Safety (EHS) to provide information to the Ministry of Labour, if required.
- The form also ensures the area supervisor is aware of, and has followed-up on, the incident/injury and/or property damage that has occurred.

Separate and confidential forms are available for submitting details of violence and harassment. This form need only be completed with minimum details: name of affected party, supervisor, location etc.
How to Fill Out this Form - The form has been divided into two sections.
The top section is to be filled out **by or for the injured person** or the person involved in a hazardous situation. Students, visitors, and volunteers may require assistance. If the injured party is unable to fill out this section, for whatever reason, it is to be completed by the area or staff member's supervisor or can be initiated by a co-worker if the supervisor is unavailable. The lower section is to be completed by the direct supervisor of the employee or of the area generating the report.

Injured Party Section

- Ensure that all personal information is entered correctly and the details of the incident are documented as thoroughly as possible. Every item in this section requires an answer. Please ensure the supervisory contact information is complete.
- If you require the use of an attachment, please indicate this by checking the "Continued on Attachment" on the bottom of page 2.
- The form is to be signed by the injured party/ worker (if they are able) or by the person reporting the incident, prior to faxing by the supervisor.
- **If you seek medical attention after the incident report form has been submitted,** please notify your supervisor and OHW.

Supervisor Section

- Contributing Factors: Check off one or more of the boxes that represent the causal factors of the incident being reported.
- For insurance reasons and/or to implement prevention strategies, ensure that any property damage is detailed in this section.
- Corrective Measures: Care must be taken to complete this important section. Indicate what steps were taken by the supervisor/employer to mitigate the risk(s) associated with the task and/or prevent its reoccurrence. For whatever action was taken or recommended, ensure that the details of the maintenance request/work order are outlined here. Also include the name of outside providers, where appropriate. **Document known facts only.**
- Acquire signatures before submitting form, if possible, however, **do not delay submitting the form if you cannot obtain the signature of the injured party or the department head**. This can be arranged later. Send the form into OHW so that the respective WSIB and MOL notifications can be made.
- Ensure that the department head, respective union/bargaining group and Local JHSC receive a copy of this form.
- When an employee notifies you that he/she will be seeing a medical professional related to this recent incident, provide them with a **Functional Abilities Form** (FAF), which can be downloaded from OHW at http://www.uoguelph.ca/hr/staff-faculty/health-well-being/injury-illness#employeeinjury or from WSIB at www.**wsib**.on.ca/files/Content/staticfiles2647A/2647A0706.pdf . Advise the employee to return the completed FAF to OHW as soon as possible.

University of Guelph
Field Research Safety Plan

Completion of the form is the responsibility of the Principal Investigator in advance of all field research expeditions.

Principal Investigator:	Contact #:	
Time Period (annual renewal)	dd/mm/yy to dd/mm/yy	
Location(s) of research activities:		
Brief Description of research activities:		
Expedition Leader or Field Safety Officer:		Onsite contact #:

First Aid/Medical Emergency *[trained personnel required for groups >5]* ☐Emergency/contact list completed *appended*	☐First Aid Kit available ☐Local emergency response phone #: _____	___ No. of personnel trained in first aid ___ Level of training: Basic/Standard + CPR Wilderness/Survival
Medical evacuation plan:		
Communication methods: ☐Cell phone (#_____) ☐Satellite phone (#_____)	☐Local hard line (#_____) ☐Radio ☐Locator beacon	
Frequency of mandatory communication with field research team: Dept contact _____	☐Daily ☐Weekly ☐Monthly ☐Other (_____)	☐Field research team to contact Principal Investigator / Departmental contact OR ☐Principal Investigator/ Dept to contact Field research team

Accommodations & Lodging:	Indoor	Camping/Outdoor *Recommended Equipment:*	
Facility name:		☐Tent	☐Adequate sleeping bags
Facility contact #:		☐Potable water required	☐Provisions – food, fuel, etc
		☐Stove/cookware/utensils	☐Lighting – lantern, flashlight, etc

Possible Hazards	*Applies?*	*Suggested Precautions*	*Precautions/Licensing*
Communicable Disease prevalent in Region	☐Yes ☐ No	☐Review regional travel advisories ☐Ensure appropriate vaccinations ☐Ensure appropriate prophylactic medication ☐Insect controls (netting, repellent)	
Health Conditions E.g., allergies, diabetes, health conditions	☐Yes ☐ No	☐Encourage participants bring adequate supply of required medication	
Predatory Animals	☐Yes ☐ No	☐Research habitat/behavior ☐Pepper spray ☐Firearms	
Firearms/Weapons (type: _____)	☐Yes ☐ No	☐Firearm license (PAL) issued to person carrying firearm ☐Training on safe use	Name and License number: _____
Venomous Animals/Plants	☐Yes ☐ No	☐Research habitat/behavior ☐Antidotes (if available)	
Work at Height *Fall protection is required at heights >3m*	☐Yes ☐ No	☐Training (e.g. ladder safety ☐Climbing equipment (& training)	Equipment certification date: _____
Electroshocking ☐Back-pack ☐Generator	☐Yes ☐ No	☐Non-conducting boat hull (if applicable) ☐CPR trained personnel ☐Rubber boots & gloves	
Marine/Aquatic ☐Research local current/surf ☐Diving Project approved Project # _____	☐Yes ☐ No	☐SCUBA ☐Chest waders ☐Safety/throw line ☐Life jacket/flotation device	SCUBA divers certificate Nos: _____ _____ _____

Hazardous Materials ☐ Chemical/ other hazardous materials ☐ Compressed Gas ☐ Radioisotopes ☐ Biological ☐ Explosives	☐ Yes ☐ No	☐ WHMIS Training by all personnel ☐ TDG Certification - name trained individuals: ☐ Personal Protective Equipment ☐ Radiation permit issued (if applicable) ☐ Biosafety permit issued (if applicable)	Permit # _____ Permit # _____
Political/Civil Unrest	☐ Yes ☐ No	☐ Local guides/security ☐ Research local travel warnings via Centre for International Programs www.uoguelph.ca/cip/ ☐ Contact numbers for Embassy/Consulate/Trade Office _____	
Extreme Environmental Conditions - arctic - desert - remote locations	☐ Yes ☐ No	☐ Survival skills training ☐ Wilderness first aid ☐ Locator beacon ☐ GPS	
Animal Care	☐ Yes ☐ No	☐ AUP approved # _____ ☐ training modules completed by all personnel	
Vehicles ☐ Cars/Trucks ☐ Water craft ☐ ATVs ☐ Snowmobiles ☐ Tractors/Heavy equipment	☐ Yes ☐ No	☐ Valid license ☐ Driver Information Profile complete ☐ Adequate insurance ☐ Equipment training & authorization	License # _____

Transportation	
Name(s) of drivers / license holder(s):	
Itinerary of Travel:	
☐ University-owned/leased ☐ Rented vehicle ☐ Public transportation - flight, train, etc	☐ All operators have valid licenses and training ☐ Health Insurance (International travel) ☐ Private vehicle (not recommended)

Boating ☐ Yes ☐ No				
Name(s) of operator card holder(s):				
Equipment:		☐ Life jackets†	☐ Flashlight/flares†	☐ Air horn/whistle†
☐ Bailing bucket†	☐ Fire extinguisher†	☐ Oars or Anchor/line†	☐ 15m buoyant rope†	☐ First Aid Kit
☐ Radio	☐ Drinking water	☐ Compass & charts	☐ Knife	☐ Spare gas tanks

† - *Required equipment for powered pleasure craft – refer to www.tc.gc.ca/marinesafety for more details*

I believe the above to be accurate and complete, and that all reasonable precautions to protect the health and safety of participants have been taken. All participants understand the safety concerns involved in this project.

Principal Investigator _____ *Department Chair* _____

Date _____ *Date* _____

PI keeps a copy. Department keeps a copy. Send approved copy (minus appendices) to Research Risk Manager, Environmental Health and Safety. Approval must be obtained from the Department Chair. Originals will be retained by the department, a copy sent to Research Risk Manager, Environmental Health and Safety. Refer to University of Guelph Safety Policy 851.06.04 for further details.

Participants Name	*Participant Contact Number (cell/home)*	*Name & Contact Number for Next of Kin*

Year _____

RELEASE and INDEMNIFICATION FORM
for FIELD TRIPS, EXCHANGES or EXCURSIONS

Name: _____

Student Number: _____

Course: _____

Field Trip, Exchange or Excursion: _____

Date of Field Trip, Exchange or Excursion: _____

I am aware that during this field trip, exchange or excursion (the**" Excursion"**) in which I am participating under the arrangements of the University of Guelph ("University"), certain risks and dangers may exist, including but not limited to the hazards of travelling, accidents or illness in remote places without medical facilities, the forces of nature and travel by air, train, automobile or other means. More particular risks for this Excursion may include but are not limited to:

_____

_____

_____

I accept and fully assume all risks, dangers and hazards and the possibility of personal injury, death, property damage or loss, resulting from my participation in this Excursion.

In consideration of approval to participate in this Excursion, I, for myself, my heirs, next of kin, executors, administrators and assigns agree to **hereby release and forever discharge the University,** its officers, directors, servants, employees and agents from any and all actions, claims and demands for damages, loss and injury, howsoever arising which now or may hereafter be sustained by me in consequence of my participation in the above-noted Excursion.

I also acknowledge the University does not carry accident or injury insurance for my benefit and also that there may be certain matters for which I could be held at fault personally. In these cases, I agree to be accountable in all respects for my own conduct and all actions, claims and demands for damages, loss and injury which may arise as a result of my own conduct. I acknowledge and agree not to ask the University, its officers, directors, servants, employees and agents to accept the consequences thereof and agree to indemnify the University, its officers, directors, servants, employees and agents from any claims or demands which might be made against the University, its officers, directors, servants, employees and agents arising out of or as a result of my own conduct.

If circumstances arise which the University, in its sole discretion considers to be an emergency, I authorize the University to disclose any of my personal medical, health or contact information, as appropriate.

I declare that I have read and understood the above <u>Release and Indemnification Form for Field Trips, Exchanges or Excursions</u> in its entirety and I hereby agree to be bound by the terms and conditions. I am aware that by signing this agreement, I am waiving certain legal rights which I, my heirs, next of kin, executors, administrators and assigns may have against the University, its officers, directors, servants, employees and agents.

Date: _____

Signature:_____ Witness: _____
Participant

Excursion Safety

Basic Safety Regulations

1. You should ordinarily travel and work in pairs or larger groups whenever the whole group splits up. There may be occasions when it is necessary to travel or work alone. In such cases, it is important to inform others of your destination, and anticipated time of return.

2. Persons with severe allergies are responsible for carrying the appropriate antidote kit. Some excursion sites are in remote locations where emergency medical treatment may not be available.

3. Persons with particular medical or dietary needs must advise the course co-ordinator and are responsible for carrying the appropriate medicines or food.

4. Persons should carry a map when working in isolated areas. As well, when working in unfamiliar heavily wooded areas, it is important to "flag" the route from the base to your study site.

5. It is critical to review all supporting course materials, especially those describing the specific risks associated with the particular areas in which the excursion will be conducted.

EMERGENCY INFORMATION

Name: _____ Student Number: _____

Course: _____

Field Trip, Exchange or Excursion: _____

OHIP Number: _____

Health Information: Do you have any allergies, drug sensitivities or any other medical condition of which the course co-ordinator should be aware. If so, please specify:

_____

_____

Emergency Contact Number:

Name: _____ Relationship: _____

Address: _____ Phone: Home:_____

Work:_____

HEALTH COVERAGE

I acknowledge that it is my responsibility to carry sufficient health insurance to cover any extra costs involved in health care inside and/or outside CANADA.

Name of other insurer(s) and policy numbers: _____

Name of policy holder (if not student): _____

Policy holder guarantees that additional coverage is in force for the duration of the field course.

Date: _____ Signature:_____
Policy holder

I acknowledge that I have read the information contained on this Excursion Safety Sheet. I acknowledge that I am responsible for my own safety and for advising the course co-ordinator of any medical condition which may impact on my participation in the Excursion. Since emergency medical treatment may not be available at all times during this Excursion, I also acknowledge my responsibility to travel with whatever medications necessitated by the above-noted condition.

Date:_____ Signature:_____
Participant

ENVIRONMENTAL HEALTH & SAFETY

Radioactive Waste Disposal Request

Date

Print Form

Contact Information

Submitted by

Phone Ext. or No.

Permit Holder

Permit Number

Location

Building Name/ Number

Room Number

Location in Room

Type of Waste

Check "ONE TYPE" only: indicate number of units

◯ Dry waste (bags) ◯ Liquid (jugs) ◯ "Iodine bins" ◯ Scintillation vials (flats)

If Scintillation vials "checked", did any vial contain more than 100,000 DPM activity"? *(Does not apply to 3-H)* ◯ Yes ◯ No If yes, those vial(s) must be set aside and disposed separately.

If Scintillation vials "checked", was an "eco-scint" product used? ◯ Yes ◯ No If no, i.e. older scintillation fluids, not acceptable.

All other forms of nuclear substance and radioactive souce items are considered Extraordinary Rad-Waste and require prior arrangement with the RSO for disposal.

Drop off and replacement items:

Indicate desired number of : Jugs: Bins/bags: Default is 1 to 1 replacement on bins/bags.

Waste stream composition: only one item per request sheet please.

NOTE: Boxes marked with (*) MUST be completed to ensure the pick-up of waste.

*Radionuclide (isotope)	*Chemical Composition	*Unique tag or identity number	+*Total Activity (µCi or kBq) - (not concentration) If undetectable put "background"	Comment: e.g., if "dry" indicate estimated weight

+"Background " means less than the mimium detectable activity

CONFIRM: Wipe test included

I hereby certify the above information to be accurate and correct:

Submitter Signature

Extra instructions:

1. All waste in RSO-approved containers only.
2. All dry waste containers must be reasonably full, but not overflowing, or they will not be taken unless prior arrangements have been made.
3. Sharps and puncturing objects (e.g. Eppendorf tips) can go into the dry waste stream (bag), along with other materials, as long as they are contained in University approved sharps containers.

FOR EHS USE ONLY

Please complete form, print, sign and submit to Environmental Health and Safety via fax 519-824-0364, inter-departmental mail, or in person .

UNIVERSITY of GUELPH

CHANGING LIVES IMPROVING LIFE

ENVIRONMENTAL HEALTH & SAFETY

Surplus Chemical and "Sharps" Disposal Request

Print Form

Complete the information as applicable and submit form to EHS.

Date

Contact information

Submitter

Submitter signature

Phone ext. or no.

Supervisor

Location

Building Name/ Number

Room Number

Location in room

Surplus chemical/waste information

Tag #	Chemical composition (list all chemical components, including water and corresponding concentrations)	Physical form	Volume or Weight	Container size	Container material

Sharps ☐ Sharps autoclaved? _____

Sharps are to be autoclaved prior to pick-up unless no suitable autoclave is available in the department and special arrangements have been made through EHS

For EHS Only - Please do not write in the section below

Special instructions/Comments

Rejected

Observations

Container returned ☐ Initials _____ Date _____ Charge ☐

Please complete form and submit to Environmental Health and Safety via email, fax 519-824-0364, inter-departmental mail, or in person to Alexander Hall room 162. For more information contact EHS at x53282.

PERSONS ON NON-EMPLOYEE WORKING STATUS

BY SIGNING THIS DOCUMENT YOU WILL WAIVE CERTAIN LEGAL RIGHTS, INCLUDING THE RIGHT TO SUE - PLEASE READ CAREFULLY!

Name: _____ Telephone: ( ) _____

Address: _____

RELEASE OF LIABILITY, WAIVER OF CLAIMS, ASSUMPTION OF RISKS AND INDEMNITY:

In consideration of approval to enter a work experience program in the University of Guelph's

_____, from _____to_____, I hereby agree as follows:

< TO WAIVE ANY AND ALL CLAIMS that I have or may in the future have against the University of Guelph and its directors, officers, employees, and representatives (all of whom are hereinafter collectively referred to as "The Releasees");

< TO RELEASE THE RELEASEES from any and all liability for any loss, damage, injury or expense that I may suffer, or that my next of kin may suffer as a result of my participation in this work experience program, due to any cause whatsoever, including negligence, breach of contract or breach of any statutory or other duty of care.

< IT IS MY RESPONSIBILITY to ensure I have adequate medical, personal health, dental and accident insurance coverage, as well as protection of my personal possessions;

< TO HOLD HARMLESS AND INDEMNIFY THE RELEASEES from any and all liability for any damage to property of, or personal injury to, any third party, resulting from my participation in this work experience program, if such liability is as a result of my acting outside the scope of my duties and responsibilities.

< THIS AGREEMENT SHALL be effective and binding upon my heirs, next of kin, executors, administrators, assigns and representatives in the event of my death or incapacity;

< IN ENTERING INTO THIS AGREEMENT, I am not relying upon any oral or written representations or statements made by the Releasees other than what is set forth in this Agreement.

< I FREELY ACCEPT AND FULLY ASSUME all risks, dangers and hazards and the possibility of personal injury, death, property damage or loss, resulting from my participation in this program.

I HAVE READ AND UNDERSTAND THIS AGREEMENT AND I AM AWARE THAT BY SIGNING THIS AGREEMENT I AM WAIVING CERTAIN LEGAL RIGHTS WHICH I OR MY HEIRS, NEXT OF KIN, EXECUTORS, ADMINISTRATORS AND ASSIGNS MAY HAVE AGAINST THE RELEASEES.

Signed this -------- day of ----------year----------

_____
Person's Signature

_____
Signature of Parent or Legal Guardian
(if Person is a Minor)

_____
Relationship to Minor

Chair or Director Signature (Witness)_____

Send Copies to: Environmental Health and Safety **9** Risk and Insurance Manager **9**

Section 7. Lab Inspections

The section includes:

- Lab Inspection checklists – used by the Local Joint Health and Safety committees when conducting workplace inspections

Biohazard Lab Inspection Checklist

Room: _____ Supervisor: _____

Inspected By: _____ Date: _____

Administrative	YES	NO	N/A
1) Are training records accessible in safety binder	☐	☐	☐
2) All lab personnel are able to readily access the following:			
a) Laboratory Safety Manual	☐	☐	☐
b) Departmental and laboratory specific policies and procedures	☐	☐	☐
c) Material Safety Data Sheets	☐	☐	☐
d) Occupational Health and Safety Handbook	☐	☐	☐

General Laboratory Work Practices	YES	NO	N/A
3) No evidence of food or beverages being consumed or stored in the lab	☐	☐	☐
4) Key lab personnel are identified	☐	☐	☐
5) Laboratory and storage areas including bench tops are uncluttered and orderly	☐	☐	☐
6) Aisles and exits are unobstructed	☐	☐	☐
7) All ceiling tiles are in place and in tact			
8) Large and/or heavy items are stored on lower shelves	☐	☐	☐
9) No storage of personnel belongings in areas with hazardous materials	☐	☐	☐
10) Long hair/loose jewellery is restrained	☐	☐	☐
11) Chemicals are not stored above eye level	☐	☐	☐
12) Are carpets and rugs prohibited in the laboratory	☐	☐	☐
13) Are chairs and other furniture used in the lab covered with a non-fabric material that can be easily decontaminated	☐	☐	☐

Emergency Preparedness	YES	NO	N/A
14) Emergency contact information is readily available	☐	☐	☐
15) Fire extinguisher is:			
a) Readily available and in a conspicuous location	☐	☐	☐
b) Unobstructed	☐	☐	☐
c) Has locking pin in tact	☐	☐	☐
d) Of an appropriate type for the hazards	☐	☐	☐
e) Free of obvious physical damage, corrosion or leakage	☐	☐	☐
f) Within the correct pressure range	☐	☐	☐
16) Extinguisher has not been used	☐	☐	☐
17) Extinguisher has been tagged within the last year	☐	☐	☐
18) Extinguisher has been inspected within the last month	☐	☐	☐
19) Safety shower is easily and readily accessible	☐	☐	☐
20) Eye wash station is easily and readily accessible	☐	☐	☐
21) Eye wash station(s) and safety shower(s) are unobstructed	☐	☐	☐
22) Eye wash station(s) are activated regularly	☐	☐	☐
23) Emergency exits are identified and known to laboratory personnel	☐	☐	☐
24) Laboratory personnel are aware or appropriate response in the event of power failure	☐	☐	☐
25) Laboratory personnel are aware of the nearest first aid kit	☐	☐	☐
26) Chemical spill kit is readily accessible and its location is known to laboratory			

personnel	☐	☐	☐
27) Chemical spill kit contains minimum required supplies	☐	☐	☐
28) Do lab personnel notify the PI immediately if there are spills and accidents that result in exposures to biohazardous material	☐	☐	☐
29) Are spills involving infectious materials contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material	☐	☐	☐
30) Is there an SOP for responding to exposure incidents	☐	☐	☐
31) Qualified electrical workers are the only persons who may install, service or repair electrical equipment	☐	☐	☐

Engineering Controls	YES	NO	N/A
32) Fume hood is operational	☐	☐	☐
33) Fume hood sash closed if not being used or opening is minimized if in use	☐	☐	☐
34) Fume hood is not used for chemical storage	☐	☐	☐
35) Large equipment in fume hood is elevated to ensure effective air flow	☐	☐	☐
36) Fume hood is neat, tidy and uncluttered	☐	☐	☐
37) No evidence of chemical fume hoods being used for biohazards or radioactive materials	☐	☐	☐
38) Electrical connections are outside of fume hood	☐	☐	☐
39) Sinks within fume hoods are protected from chemical spills	☐	☐	☐
40) Fume hoods are fitted with a low flow alarm	☐	☐	☐
41) Is there a biological safety cabinet in the lab, has it been certified within the past year	☐	☐	☐
42) Is the Biosafety Cabinet free of equipment or supplies that can block the air grills and disrupt proper airflow	☐	☐	☐
43) Is a Biosafety Cabinet used when high concentrations or large volumes of biohazardous materials are handled	☐	☐	☐
44) Is equipment for use or storage of biohazardous materials (i.e. refrigerator, freezers) labeled with a biohazard symbol	☐	☐	☐

Personal Protective Equipment	YES	NO	N/A
45) Adequate eye protection is worn as required (At a minimum safety glasses with permanent side shields are worn in the lab)	☐	☐	☐
46) Gloves are available and worn as required	☐	☐	☐
47) Lab coats are available and worn as required	☐	☐	☐
48) Close toed and close heeled shoes are worn in the lab	☐	☐	☐
49) No evidence of lab coats or gloves being worn in non-lab areas (with the exception of hallways if being used to travel between lab/storage areas)	☐	☐	☐
50) All personnel using respirators have been fit-tested and trained	☐	☐	☐
51) Other PPE is available and used as required (e.g. hearing protection)	☐	☐	☐

Hazard Control and Storage	YES	NO	N/A
52) Chemicals and biohazards have been added to inventory and inventory is maintained	☐	☐	☐
53) Receipt and/or expiry dates are marked on time sensitive chemical and biohazard containers	☐	☐	☐
54) Flammable liquids not in use are stored in approved flammable solvent cabinets	☐	☐	☐
55) Immediate use quantities only of flammable liquids are in the open area of the lab to			

a maximum of 50L	☐	☐	☐
56) No more than 235L of flammable liquids are stored in approved flammable storage cabinets in the lab	☐	☐	☐
57) Flammable liquids storage containers are less than 5L unless they are approved safety cans which are less than 25L	☐	☐	☐
58) No evidence of flammable and/or combustible materials being stored in household fridges/freezers	☐	☐	☐
59) Household refrigerators are labelled as not appropriate to store flammable/combustible liquids within it	☐	☐	☐
60) Flammable storage cabinets have vents capped or are actively vented using materials that maintain structural integrity	☐	☐	☐
61) Incompatible chemicals are stored separately	☐	☐	☐
62) Storage shelves are sturdy and secure	☐	☐	☐
63) Chemical and biohazard containers are in good condition (not leaking, lids not cracked etc.)	☐	☐	☐
64) Chemicals and biohazards labelled appropriately and labels are legible	☐	☐	☐
65) Containers are kept closed when not in use	☐	☐	☐

Compressed Gases	YES	NO	N/A
66) Cryogenic liquids are dispensed and handled in well ventilated areas	☐	☐	☐
67) Oxygen sensors are located in areas where volume of gas could result in dangerous displacement of oxygen	☐	☐	☐
68) Gas cylinders not in use have regulators removed and the protective cap in place	☐	☐	☐
69) Cylinders are secured at roughly 2/3 of their height in an upright position. Lecture bottles are stored appropriately	☐	☐	☐
70) Restraints/brackets are in good condition	☐	☐	☐
71) Cylinders are well removed from doors, aisles, stairs and elevators	☐	☐	☐
72) Cylinder cart is available for transport	☐	☐	☐
73) Incompatible gases are segregated	☐	☐	☐
74) Regulators appear to be in good condition	☐	☐	☐

Blood borne Pathogens and Recombinant DNA	YES	NO	N/A
75) Do lab personnel have access to copies of SOPs for recombinant DNA materials	☐	☐	☐

Waste Disposal	YES	NO	N/A
76) Sharps containers are available for sharps disposal	☐	☐	☐
77) Procedures for hazardous waste disposal are known to laboratory personnel	☐	☐	☐
78) Container is available for disposal of broken glass	☐	☐	☐
79) Hazardous waste is stored appropriately	☐	☐	☐
80) No evidence of the accumulation of hazardous waste	☐	☐	☐
81) Sewage disposal sticker posted and is visible at each sink	☐	☐	☐
82) No evidence of unacceptable sewer discharges to the sink	☐	☐	☐

Equipment	YES	NO	N/A
83) Instruction manuals and/or SOPs are available for equipment	☐	☐	☐
84) Personnel are trained in safe use of equipment (e.g. autoclaves, centrifuges)	☐	☐	☐

85) Moving parts and/or pinch points of equipment are guarded appropriately	☐	☐	☐

Electrical Safety	YES	NO	N/A
86) Power bars meet UoG standards	☐	☐	☐
87) No evidence of piggybacking of extension cords	☐	☐	☐
88) Electrical cords are in good condition (not frayed etc.)	☐	☐	☐
89) Electrical cords are clear of aisles, sinks and heat sources	☐	☐	☐

Additional Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Classroom/Computer Lab Inspection Checklist

Room: _____ Supervisor: _____

Inspected By: _____ Date: _____

Space and Layout	YES	NO	N/A
90) Enough space to move around safely	☐	☐	☐
91) Students able to sit at workstations comfortably	☐	☐	☐
92) Enough desk/bench space for the work & equipment in routine use	☐	☐	☐
93) Garbage and recycling collected often enough	☐	☐	☐
94) Area clean and free of clutter	☐	☐	☐

Environment	YES	NO	N/A
95) Are windows in clean and safe condition	☐	☐	☐
96) Are photocopier/printer fumes removed to prevent unpleasant smells	☐	☐	☐
97) Can windows be opened easily	☐	☐	☐
98) Is lighting adequate in all areas (in working order, clean and free of flicker or glare)	☐	☐	☐
99) Is the room temperature comfortable	☐	☐	☐

Slips, Trips and Manual Handling	YES	NO	N/A
100) Are floor surfaces, carpets etc. in a safe condition (no cracks, tears, fraying, slippery or uneven spots etc.)	☐	☐	☐
101) Are floors free of trailing cables, boxes and other trip hazards	☐	☐	☐
102) Are stepladder or stools used to reach high shelves a suitable height and in safe condition	☐	☐	☐
103) Are heavy and awkward items stored at waist height where possible	☐	☐	☐
104) Are trolleys available for moving heavy or large loads	☐	☐	☐

Emergency Preparedness	YES	NO	N/A
105) Emergency contact information is readily available	☐	☐	☐
106) Fire alarm pull stations are unobstructed and in working order	☐	☐	☐
107) Laboratory personnel are aware or appropriate response in the event of power failure	☐	☐	☐
108) Stocked first aid kit is available	☐	☐	☐
109) Laboratory personnel are aware of the nearest first aid kit	☐	☐	☐
110) Fire extinguisher is:			
a) Readily available and in a conspicuous location	☐	☐	☐
b) Unobstructed	☐	☐	☐
c) Has locking pin in tact	☐	☐	☐
d) Of an appropriate type for the hazards	☐	☐	☐
e) Free of obvious physical damage, corrosion or leakage	☐	☐	☐
111) Extinguisher has not been used	☐	☐	☐
112) Extinguisher has been tagged within the last year	☐	☐	☐
113) Extinguisher has been inspected within the last month	☐	☐	☐
114) Qualified electrical workers are the only persons who may install, service or repair electrical equipment	☐	☐	☐

People with Disabilities	YES	NO	N/A
115) Is there access for people with impaired mobility (e.g. crutches, wheel chairs)	☐	☐	☐
116) Is there access to disabled toilets within reasonable distance	☐	☐	☐
117) Do emergency evacuation procedures include people with disabilities (e.g. those who have impaired mobility, or can't hear fire alarms or see fire exits)	☐	☐	☐
118) Are there up-to-date Personal Emergency Evacuation Plans for individual staff and students if necessary	☐	☐	☐

Furniture, Fittings and Equipment	YES	NO	N/A
119) Are furniture and fittings in good condition	☐	☐	☐
120) Are height adjustable chairs provided for working at desk/bench	☐	☐	☐
121) Is all equipment working properly	☐	☐	☐
122) Are hot, sharp or dangerous moving parts guarded	☐	☐	☐
123) Are instructions manuals available	☐	☐	☐
124) Are there enough accessible power points to avoid overloading sockets	☐	☐	☐
125) Is all portable electrical equipment tested regularly (every 3 years – check test label)	☐	☐	☐
126) Do all electrical equipment and cables pass visual inspection	☐	☐	☐

Visual Inspection	YES	NO	N/A
127) Is the cable covering intact	☐	☐	☐
128) Damage to the plug – is the casing intact and pins straight	☐	☐	☐
129) Is the lead intact without any joints	☐	☐	☐
130) The outer covering of the cable is gripped where it enter the plug or equipment (see if the coloured insulation or copper of internal wires are completely covered)	☐	☐	☐
131) The plug, equipment or socket is free from indications of overheating (e.g. brown burn marks	☐	☐	☐

Additional Comments:

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Electrical Lab Inspection Checklist

Room: _____ Supervisor: _____

Inspected By: _____ Date: _____

Administrative	YES	NO	N/A
132) Are training records accessible in safety binder	☐	☐	☐
133) Personnel are trained in lab specific safe use of equipment	☐	☐	☐
134) All lab personnel are able to readily access the following:			
a) Laboratory Safety Manual	☐	☐	☐
b) Departmental and laboratory specific policies and procedures	☐	☐	☐
c) Material Safety Data Sheets	☐	☐	☐
d) Occupational Health and Safety Handbook	☐	☐	☐

General Laboratory Work Practices	YES	NO	N/A
135) No evidence of food or beverages being consumed or stored in the lab	☐	☐	☐
136) Key lab personnel are identified	☐	☐	☐
137) Information is current and applicable to the lab (door signs, warning signs, etc.)	☐	☐	☐
138) View through door's window is unobstructed	☐	☐	☐
139) Aisles and exits are unobstructed	☐	☐	☐
140) Laboratory and storage areas including bench tops are uncluttered and orderly	☐	☐	☐
141) All ceiling tiles are in place and in tact	☐	☐	☐
142) Large and/or heavy items are stored on lower shelves			
143) Equipment is secured or on stable surfaces	☐	☐	☐
144) Auto shut-offs are on equipment	☐	☐	☐
145) Equipment is unobstructed	☐	☐	☐

Equipment	YES	NO	N/A
146) Instruction manuals and/or SOPs are available for equipment	☐	☐	☐
147) Moving parts and/or pinch points of equipment are guarded appropriately	☐	☐	☐
148) Cords do not dangle from counters in a manner to be unplugged, pulled off, or tripped over	☐	☐	☐

Electrical Safety	YES	NO	N/A
149) Emergency cut-off switches are accessible	☐	☐	☐
150) Electrical panels are accessible	☐	☐	☐
151) No evidence of piggybacking of extension cords	☐	☐	☐
152) Electrical cords are in good condition (not frayed etc.)	☐	☐	☐
153) Outlets are not overloaded	☐	☐	☐
154) GFCI (GFI) outlets are present (where applicable)	☐	☐	☐
155) Electrical cords are clear of aisles, sinks and heat sources	☐	☐	☐
156) Power bars meet UoG standards	☐	☐	☐
157) Is there more than two high current draw devices plugged into the same outlet (could lead to overheated wires and arcing)	☐	☐	☐

Emergency Preparedness	YES	NO	N/A
158) Emergency contact information is readily available	☐	☐	☐
159) Fire alarm pull stations are unobstructed and in working order	☐	☐	☐
160) Laboratory personnel are aware or appropriate response in the event of power failure	☐	☐	☐
161) Stocked first aid kit is available	☐	☐	☐
162) Laboratory personnel are aware of the nearest first aid kit	☐	☐	☐
163) Fire extinguisher is:			
a) Readily available and in a conspicuous location	☐	☐	☐
b) Unobstructed	☐	☐	☐
c) Has locking pin in tact	☐	☐	☐
d) Of an appropriate type for the hazards	☐	☐	☐
e) Free of obvious physical damage, corrosion or leakage	☐	☐	☐
164) Extinguisher has not been used	☐	☐	☐
165) Extinguisher has been tagged within the last year	☐	☐	☐
166) Extinguisher has been inspected within the last month	☐	☐	☐
167) Qualified electrical workers are the only persons who may install, service or repair electrical equipment	☐	☐	☐

Personal Protective Equipment	YES	NO	N/A
168) Adequate eye protection is worn as required (At a minimum safety glasses with permanent side shields are worn in the lab)	☐	☐	☐
169) Gloves are available and worn as required	☐	☐	☐
170) Close toed and close heeled shoes are worn in the lab	☐	☐	☐
171) Other PPE is available and used as required (e.g. hearing protection)	☐	☐	☐

Additional Comments:

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Machine Shop Inspection Checklist

Room: _____ Supervisor: _____

Inspected By: _____ Date: _____

Administrative	YES	NO	N/A
172) Are training records accessible in safety binder	☐	☐	☐
173) All lab personnel are able to readily access the following:			
a) Laboratory Safety Manual	☐	☐	☐
b) Departmental and laboratory specific policies and procedures	☐	☐	☐
c) Material Safety Data Sheets	☐	☐	☐
d) Occupational Health and Safety Handbook	☐	☐	☐

Safeguarding Requirements	YES	NO	N/A
174) All hazardous moving parts of the machine, including auxiliary parts have safeguards	☐	☐	☐
175) Safeguards prevent workers' hands, arms and other body parts from making contact with dangerous moving parts	☐	☐	☐
176) Fixed guards require tools to be removed	☐	☐	☐
177) Safeguards ensure that no objects will fall into moving parts	☐	☐	☐
178) Machines can be lubricated and have routine maintenance without removal of safeguard	☐	☐	☐
179) Safeguards have not been tampered with, altered or removed	☐	☐	☐
180) Rotating parts that are exposed to workers are guarded (such as friction drives, shafts, couplings and collars, set screws and bolts, keys and keyways, projecting shaft ends)	☐	☐	☐
181) Gears, sprockets, pulleys, or flywheels are guarded	☐	☐	☐
182) Belts, ropes or chain drives are guarded (not exposed)	☐	☐	☐
183) All gears and chain sprockets are either completely enclosed, or have band-type guards	☐	☐	☐
184) Powered machinery/equipment			
a) Has start and stop controls located within easy reach of the operator	☐	☐	☐
b) Has controls and switches whose function are clearly identified	☐	☐	☐
185) Dust-generating tools and machinery have adequate controls to minimize dust	☐	☐	☐
186) Physical hazards are marked in a manner that clearly identifies the hazard to the affected workers	☐	☐	☐

Electrical Hazards	YES	NO	N/A
187) There are no conduit fittings	☐	☐	☐
188) Machines are properly grounded	☐	☐	☐
189) Power supplies are correctly fused and protected	☐	☐	☐
190) Workers do not receive minor shocks while operating any machinery	☐	☐	☐

Training	YES	NO	N/A
191) Operators and maintenance workers have the necessary training in how and under what circumstances to use/remove the safeguards	☐	☐	☐

192) Workers have been trained in the procedure to follow if they notice guards that are damaged, missing or inadequate	☐	☐	☐
193) Workers are trained and work procedures are available for the safe use of:			
a) Power operated tools	☐	☐	☐
b) Abrasive tools	☐	☐	☐
c) Hoists and cranes	☐	☐	☐
d) Powder actuated tools	☐	☐	☐
194) Machines, pieces of equipment and industrial processes are operated in accordance with the manufacturer's recommendations and instructions and with WCB Regulation	☐	☐	☐

Personal Protective Equipment	YES	NO	N/A
195) Cutting or cooling fluids, metal chips, scarf or turnings from machine tool work are contained	☐	☐	☐
196) Adequate eye protection is worn as required (At a minimum safety glasses with permanent side shields are worn in the lab)	☐	☐	☐
197) Operators are dressed safely (no loose-fitting clothing or jewelry)	☐	☐	☐
198) All personnel using respirators have been fit-tested and trained	☐	☐	☐
199) Other PPE is available and used as required (e.g. hearing protection)	☐	☐	☐

Lock-Out	YES	NO	N/A
200) Lock-out procedures are implemented and available to all workers who are required to work on machinery and equipment	☐	☐	☐
201) Machines are locked out from their power sources before repairs are begun	☐	☐	☐
202) Effective means of verifying lock-out are provided	☐	☐	☐
203) Workers are trained in lock-out procedures and know their responsibilities	☐	☐	☐

Emergency Preparedness	YES	NO	N/A
204) Emergency contact information is readily available	☐	☐	☐
205) Fire alarm pull stations are unobstructed and in working order	☐	☐	☐
206) Laboratory personnel are aware or appropriate response in the event of power failure	☐	☐	☐
207) Stocked first aid kit is available	☐	☐	☐
208) Laboratory personnel are aware of the nearest first aid kit	☐	☐	☐
209) Fire extinguisher is:			
a) Readily available and in a conspicuous location	☐	☐	☐
b) Unobstructed	☐	☐	☐
c) Has locking pin in tact	☐	☐	☐
d) Of an appropriate type for the hazards	☐	☐	☐
e) Free of obvious physical damage, corrosion or leakage	☐	☐	☐
210) Extinguisher has not been used	☐	☐	☐
211) Extinguisher has been tagged within the last year	☐	☐	☐
212) Extinguisher has been inspected within the last month	☐	☐	☐
213) Qualified electrical workers are the only persons who may install, service or repair electrical equipment	☐	☐	☐

Housekeeping		YES	NO	N/A
214)	Bench tops and sink areas are tidy	☐	☐	☐
215)	Tripping hazards are absent	☐	☐	☐
216)	All exits and passageways are unblocked and clear	☐	☐	☐
217)	Food and drink absent	☐	☐	☐
218)	Step-ladder available for out-of-reach items	☐	☐	☐
219)	Signs are all posted and legible (not faded or peeling)	☐	☐	☐

Additional Comments:

Section 8. Policies

The section include:

- Table of locations where other relevant policies are available
- Laboratory Safety Policy

Names and Locations of Relevant Policies

EHS POLICIES **https://www.uoguelph.ca/hr/ehs/health-and-safety-policy-listing**
851.01.09 Volunteers
851.01.13 Reporting Hazardous Conditions
851.04.02 Injury and Incident Reporting
851.06.04 Field Work
851.06.10 Safety Orientation and Training
851.08.14 Hazardous Waste Management
851.08.17 Laboratory Safety
HR POLICIES **https://www.uoguelph.ca/hr/managers-policies-standards-agreements/hr-policies**
512 Hazardous Weather/Emergency Closing Procedures
OTHER

Volunteers

Effective: September 2000

Vice-President,
Finance and Administration

Applicable Legislation:
Occupational Health and Safety Act (OHSA), R.S.O. 1990, Section 25(2)(h)

Intent: To promote due diligence when volunteers (i.e. persons with non-employee status) are engaged to provide service to the University of Guelph.

Policy:

1. Only personnel authorized by their Deans or Directors shall engage persons to serve as volunteers at the University of Guelph.

2. The potential or inherent risks associated with the planned activity shall be explained to the prospective volunteer.

3. Prospective volunteers shall be given time to read and understand and seek advice about any release of liability form that they are asked to sign for the University.

4. Proof of age must be requested if necessary. (See Safety Policy 851.01.11)

5. Copies of completed "Release of Liability, Waiver of Claims, Assumption of Risks and Indemnity" forms shall be forwarded to the Office of the Insurance Manager.

6. Appropriate orientation, training, and supervision shall be provided for all volunteers at the commencement of their service work. (See Safety Policy 851.06.10 concerning Safety Orientation and Training.)

7. Environmental Health and Safety shall be consulted about volunteer activities that may involve unusual health and safety risks.

Guidelines:

"Release of Liability, Waiver of Claims, Assumption of Risks and Indemnity" form for Persons on Non-Employee Working Status may be obtained from the Office of the Insurance Manager and from Environmental Health and Safety (EHS). The form is shown on page 2.

UNIVERSITY OF GUELPH

PERSONS ON NON-EMPLOYEE WORKING STATUS

BY SIGNING THIS DOCUMENT YOU WILL WAIVE CERTAIN LEGAL RIGHTS, INCLUDING THE RIGHT TO SUE - PLEASE READ CAREFULLY!

Name: _____ Telephone: ( ) _____

Address: _____

RELEASE OF LIABILITY, WAIVER OF CLAIMS, ASSUMPTION OF RISKS AND INDEMNITY:

In consideration of approval to enter a work experience program in the University of Guelph's

_____, from _____ to _____, I hereby agree as follows:

- TO WAIVE ANY AND ALL CLAIMS that I have or may in the future have against the University of Guelph and its directors, officers, employees, and representatives (all of whom are hereinafter collectively referred to as "The Releasees");
- TO RELEASE THE RELEASEES from any and all liability for any loss, damage, injury or expense that I may suffer, or that my next of kin may suffer as a result of my participation in this work experience program, due to any cause whatsoever, including negligence, breach of contract or breach of any statutory or other duty of care.
- IT IS MY RESPONSIBILITY to ensure I have adequate medical, personal health, dental and accident insurance coverage, as well as protection of my personal possessions;
- TO HOLD HARMLESS AND INDEMNIFY THE RELEASEES from any and all liability for any damage to property of, or personal injury to, any third party, resulting from my participation in this work experience program, if such liability is as a result of my acting outside the scope of my duties and responsibilities.
- THIS AGREEMENT SHALL be effective and binding upon my heirs, next of kin, executors, administrators, assigns and representatives in the event of my death or incapacity;
- IN ENTERING INTO THIS AGREEMENT, I am not relying upon any oral or written representations or statements made by the Releasees other than what is set forth in this Agreement.
- I FREELY ACCEPT AND FULLY ASSUME all risks, dangers and hazards and the possibility of personal injury, death, property damage or loss, resulting from my participation in this program.

I HAVE READ AND UNDERSTAND THIS AGREEMENT AND I AM AWARE THAT BY SIGNING THIS AGREEMENT I AM WAIVING CERTAIN LEGAL RIGHTS WHICH I OR MY HEIRS, NEXT OF KIN, EXECUTORS, ADMINISTRATORS AND ASSIGNS MAY HAVE AGAINST THE RELEASEES.

Signed this -------- day of ----------year----------

_____
Person's Signature

_____
Signature of Parent or Legal Guardian
(if Person is a Minor)

_____
Relationship to Minor

Chair or Director Signature (Witness) _____

Send Copy to: Insurance Manager, Financial Services

Reporting Hazardous Conditions

Effective: September 2000

Vice-President,
Finance and Administration

Applicable Legislation:
Occupational Health and Safety Act (OHSA), R.S.O. 1990
Occupiers' Liability Act, R.S.O. 1990

Intent: To outline the University's policy regarding the reporting of hazardous conditions by employees and students.

Definitions:

due diligence means taking every precaution reasonable under the circumstances to protect the health and safety of workers.

hazardous condition an existing or potential condition in the workplace that, by itself or by interacting with other variables, can result in personal injury, illness, fatality, property damage or other losses.

internal responsibility system joint participation of workers and employers with equal powers to act on health and safety matters; a system of internal review for occupational health and safety and quality that is shared by all parties in the workplace.

near miss incident an unplanned event that had the potential for property loss or injury.

occupier a person who is in physical possession of premises, or a person who has responsibility for and control over the condition of premises or the activities there carried on, or control over persons allowed to enter the premises.

Requirements of the *Occupational Health and Safety Act, Section 28(1)*

28(1) ***Duties of workers.*** *- A worker shall,*

(c) report to his or her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker; and

(d) report to his or her employer or supervisor any contravention of this Act or the regulations or the existence of any hazard of which he or she knows.

Requirements of the *Occupiers' Liability Act*

3.3(1) An occupier of premises owes a duty to take such care as in all the circumstances of the case is reasonable to see that persons entering on the premises, and the property brought on the premises by those persons are reasonably safe while on the premises.

3.(2) The duty of care provided for in subsection (1) applies whether the danger is caused by the condition of the premises or by an activity carried on in the premises.

5.(2) A contract shall not by virtue of this Act have the effect, unless it expressly so provides, of making an occupier who has taken reasonable care, liable to any person not a party to the contract, for dangers due to the faulty execution of any work of construction, maintenance or repair, or other like operation by persons other than the occupier, employees of the occupier and persons acting under the occupier's direction and control.

Policy:

1. Employees and students shall report hazardous conditions to their immediate workplace or activity supervisors, or to Environmental Health and Safety. Near-miss incidents and personal injury accidents shall be documented via the University's Injury/Incident Report (See Safety Policy 851.04.02).

2. Supervisors shall take appropriate actions and due diligence initiatives to mitigate risks to health and safety and to implement loss control procedures.

3. Health and safety matters that cannot be resolved by line management shall be referred to higher University authorities by workplace or activity supervisors.

4. Employees shall refer health and safety issues to line management. This approach will promote internal responsibility. Unresolved issues may be referred to the Department Chair/Head, Environmental Health and Safety and/or to the local joint health and safety committee.

5. Management shall keep employees informed about outstanding health and safety issues via appropriate progress reports to local joint health and safety committees.

6. Unsafe work procedures by contractors and subcontractors shall be reported to the job-site supervisor and/or to the University Project Coordinator in Physical Resources or to the person in the department contracting the work.

Guidelines:

OHSA mandates responsibility for workplace safety to both employers and employees. It is expected that both parties are to be vigilant for foreseeable workplace risks and unsafe situations. Both employers and employees are to take reasonable and prudent steps to correct or avoid problem situations within the parameters of their workplace responsibilities.

See Safety Policy 851.04.02 concerning Injury and Incident Reporting and Safety Policy 851.01.14 concerning Risk Management.

Injury and Incident Reporting

Effective: September 2000

Vice-President,
Finance and Administration

Applicable Legislation:
Workplace Safety and Insurance Act, 1997
Occupational Health and Safety Act (OHSA), R.S.O. 1990, Sections 51,52,53
O. Reg. 851, R.R.O. 1990, Industrial Establishments, Section 5.

Intent: To define the University's injury/incident reporting procedures for compliance with the *Occupational Health and Safety Act*, the *Workplace Safety and Insurance Act*, and WSIB occupational injury reporting requirements.

Definitions:

critical injury defined under the *Occupational Health and Safety Act* and Regulations, as an injury of a serious nature that,

(a) places life in jeopardy;
(b) produces unconsciousness;
(c) results in substantial loss of blood;
(d) involves the fracture of a leg or arm but not a finger or toe;
(e) involves the amputation of a leg, arm, hand or foot but not a finger or toe;
(f) consists of burns to a major portion (i.e. > 10%) of the body; or
(g) causes the loss of sight in an eye.

first aid includes but is not limited to: cleaning minor cuts, scrapes or scratches; treating a minor burn, applying bandages and/or dressings, cold compress, cold pack, ice bag, splint, changing a bandage or a dressing after a follow-up observation visit and any follow-up for observation purposes only.

medical aid includes services requiring the professional skills of a health care practitioner (i.e. a doctor, nurse, chiropractor or physiotherapist), services provided a hospitals and health facilities and prescription drugs.

Requirements of the *Occupational Health and Safety Act, Section 51*

51.(1) ***Notice of death or injury*** *- Where a person is killed or critically injured from any cause at a workplace, the constructor, if any, and the employer shall notify an inspector, and the committee, health and safety representative and trade union, if any, immediately of the occurrence by telephone, telegram or other direct means and the employer shall, within forty-eight hours after the occurrence, send to a Director a written report of the circumstances of the occurrence containing such information and particulars as the regulations prescribe. (*See O.Reg.851, Section 5.*)*

(2) ***Preservation of wreckage*** *- Where a person is killed or is critically injured at a workplace, no person shall, except for the purpose of,*

(a) saving life or relieving human suffering;

(b) maintaining an essential public utility service or a public transportation system; or

(c) *preventing unnecessary damage to equipment or other property,*

interfere with, disturb, destroy, alter or carry away any wreckage, article or thing at the scene of or connected with the occurrence until permission to do so has been given by an inspector.

Policy:

1. All workplace injuries and/or diseases shall be reported by employees within 24 hours to their supervisors and to Environmental Health and Safety. (The FAX number is 519-824-0364.)

2. The workplace supervisor shall report all personal injury and near-miss incidents to Environmental Health and Safety via an "Injury/Incident Report" form. The form may not be delayed for lack of information or signatures. WSIB fines for late reporting may be charged back to the injured employee's department or administrative unit by Environmental Health and Safety.

3. Critical injuries to employees, students, visitors and contractors shall be reported by telephone immediately to Environmental Health and Safety and to the Regional College WSIB Contact as appropriate. The Ministry of Labour shall also be notified by telephone in accordance with the *Occupational Health and Safety Act, Section 51(1)*, and *O. Reg. 851, Section 5*. (Also, see Safety Policy 851.03.02 concerning Medical Emergencies.)

4. The workplace supervisor shall preserve the scene of a critical injury accident in accordance with *Occupational Health and Safety Act*, Section 51(2), until a Ministry of Labour inspector advises otherwise.

5. Employees shall maintain communication with their supervisors post injury and shall report changes in their return to work status or condition in accordance with the *Workplace Safety and Insurance Act,* Section 40 (2).

6. All incidents involving personal injuries to students or visitors shall be reported to Environmental Health and Safety on the "Injury/Incident Report".

Guidelines:

Copies of the University's "Injury/Incident Report" are available from Environmental Health and Safety and from the Regional College WSIB Contacts. The names of the WSIB Contacts and the report form are shown in Appendix 1.

1. **Workplace Safety and Insurance Board Requirements**

   (a) All full-time, part-time and temporary employees of the University are covered under the *Workplace Safety and Insurance Act* for injuries and illnesses resulting from their employment. Coverage includes payment for health care costs and loss of earnings due to time lost from work.

   (b) Under the *Act*, the University must report to the Workplace Safety and Insurance Board (WSIB) within three days, every accident to a worker which results in time away from work past the day of the accident or which necessitates health care from an external medical facility or licenced medical practitioner such as physician, dentist, chiropractor or specialist.

   (c) The WSIB levies a fine for late reporting of a lost time or health care claim. Where this late reporting is the result of failure to report the incident to the Environmental Health and Safety Department (EHS), the fine shall be charged back to that department or administrative unit. Work-related incidents, injuries, or occupational diseases shall be reported promptly, within 24 hours.

2. **Ministry of Labour Requirements**

   (a) When an employee is absent from work beyond the day of injury, a copy of the WSIB Employer's Report of Accident (Form 7) shall be submitted to the Ministry of Labour by Environmental Health and Safety. Copies are also forwarded to the employee, Occupational Health Services, and Human Resources.

(b) The University is required to report all critical injuries immediately by telephone to the Ministry of Labour in accordance with Section 51(1) of the *Occupational Health and Safety Act*. This responsibility rests with EHS and with workplace supervisors. The appropriate trade unions must also be notified. *Section 5* of *O. Reg. 851* for Industrial Establishments outlines the information to be supplied to the Ministry of Labour with any notice of accident.

3. **University Liability Insurance Requirements**

All incidents involving personal injury to a student or visitor shall be reported to Environmental Health and Safety. The University "Injury/Incident Report" form shall be used. Information may be forwarded to the Office of the Risk and Insurance Manager, ext. 8752. All incidents involving substantial damage to the property of a student or visitor shall be reported to Security Services or to the Regional College Director.

4. **Responsibilities of Supervisors**

Supervisors are responsible for the following:

< arranging first aid or medical aid for injured persons;

< immediately reporting all critical injuries by telephone to EHS and to the Regional College WSIB Contact as appropriate;

< preserving the scene of a critical injury accident until the Ministry of Labour inspector advises otherwise (OHSA, Section 51(2));

< reporting all personal injury or near-miss incidents to the Environmental Health and Safety Department and to the Regional College WSIB Contact if appropriate, using the University's "Injury/Incident Report". This form shall be completed by the supervisor and signed by the Department Head/Chair or designate and **faxed within 24 hours**. (Notification shall not be delayed for lack of information or signatures);

< ensuring that a worker representative from the departmental (local) joint health and safety committee is given an opportunity to participate in the investigation of a critical injury;

< following-up on required corrective actions;

< reporting all injuries to students or visitors using the "Injury/Incident Report Form";

- forwarding all WSIB Functional Abilities Forms to Environmental Health and Safety and to Occupational Health Services. (See Safety Policy 851.13.08.)

5. **Responsibilities of Employees**

Employees shall:

- immediately report to their supervisor any incident involving injury, illness, onset of work-related disease, equipment or property damage;
- obtain first aid or medical aid as required in cases of injury, and report such treatment to the supervisor;
- provide information regarding the circumstances which led to the injury or incident;
- if available, participate in the completion of the "Injury/Incident Report";
- contact the University's workplace supervisor and/or Occupational Health Services as soon as possible after the injury and maintain communication throughout the period of recovery and return to work;
- have a WSIB Functional Abilities form completed by the health care practitioner and return this form to the workplace supervisor (see Safety Policy 851.13.08 concerning Return to Work);
- assist the supervisor to identify appropriate employment;
- co-operate with the University and the WSIB towards the goal of safe and timely return to work.

6. **Responsibilities of the Environmental Health and Safety Department**

- provide direction and technical assistance for accident and near-miss investigations;
- review incident/injury reports and make safety recommendations;
- ensure that the appropriate employee representatives on Joint Health and Safety Committees and trade unions receive copies of all injury/incident reports for incidents in their jurisdictions;

- liaise with the Workplace Safety and Insurance Board and administer all claims;

- assist the supervisor and the department to identify appropriate employment;

- train supervisors about incident investigation procedures and job modification for employees;

- compile and distribute WSIB injury statistics and make recommendations to management concerning loss control initiatives to reduce accident frequencies and costs.

7. **Responsibilities of the Office of the Risk and Insurance Manager**

- assess injury/incident reports related to injuries involving students or visitors and/or equipment or property damage for potential institutional liability; and

- liaise with insurance underwriters, adjusters and legal counsel in all matters pertaining to potential institutional liability arising from student and visitor injuries, contractor issues, and equipment or property damage.

Appendix 1

University of Guelph WSIB Claims Management

Gisele MacNeil, Occupational Health Services, (519) 824-4120 Ext. 52133

Regional College Contacts

Alfred College
Michael Herbert (613) 679-2218 ext.308

Plant Agriculture Department Research Stations

Vineland
Sylvanna Lagrotteria (905) 562-4141 Ext. 145

Kettleby (Muck Station)
Shawn Janse (905) 775-3783

Simcoe
Wally Andres (519) 426-7127 Ext. 344

Kemptville College
Maureen Leeson (613) 258-8334

New Liskeard Research Station
Emo Research Station
Thunder Bay Research Station
John Rowsell (705) 647-8525 Ext. 221

Ridgetown College
John Brooks (519) 674-1510

Laboratory Services Division

Guelph	Administration	Helen Hebden (519) 767-6247
	Animal Health Lab	Leslie Levy (519) 824-4120 Ext. 4515
Kemptville	Animal Health Lab	Vivian Martineau (613) 258-8320 Ext. 539
Ridgetown	Ruth Scott (519) 674-1552	

Revised November 12 '01

Respiratory Protection Programs

Effective: September 2000

Vice-President,
Finance and Administration

Applicable Legislation:
Occupational Health and Safety Act (OHSA), R.S.O. 1990, Sections 25 to 28
O. Reg. 851, R.R.O. 1990, Industrial Establishments, 79, 127, 128(2)(b), 130, 137, 138
O. Reg. 833/90 Control of Exposure to Biological or Chemical Agents, Sections 3,7, and Schedule [1]

Relevant Standards:
Canadian Standards Association (CSA)*:*
Z94.4-93 (R1997): Selection, Use, and Care of Respirators
Z180.1-M85: Compressed Breathing Air and Systems

Intent: To outline University policy regarding the use of approved respiratory protection to protect employees from airborne hazardous contaminants.

Definitions:

ACGIH American Conference of Governmental Industrial Hygienists.

*aerosol*s airborne solid or liquid particles.

air-line respirator supplies breathing air along a hose to the wearer's face piece.

air-purifying respirator removes contaminants from workplace air by passing it through a filter, a cartridge, or a combination of both, to provide protection from combinations of particulates, vapours, or gases. Types of air-purifying respirators include the full-facepiece (i.e. fit over the nose, mouth and eyes) and the half-facepiece (i.e. fits over the nose, mouth and chin) that have attachments for filters and/or cartridges. Air-purifying respirators will not provide adequate protection in oxygen deficient atmospheres or in contaminated atmospheres with poor sensory warning properties (e.g taste, odour, eye and/or respiratory irritation).

APF	*assigned protection factor*; the level of respiratory protection that would be provided by a properly functioning respirator worn by a properly fitted and trained individual; a multiplier of the permissible exposure limit of a contaminant that defines the highest air concentration of a workplace atmosphere where use of a specified respirator is permitted.
chemical cartridge	removes specific gases or vapours from the workplace atmosphere. High concentrations of contaminants, high humidity and high breathing rates will shorten the breakthrough times and usefulness of chemical cartridges.
dusts	solid, mechanically produced particles or fibres; airborne solid particles caused by abrasive procedures such as grinding and cutting.
filter facepiece respirator	a respirator worn to protect the wearer from particulates and some atmospheric contaminants.
fit testing	exercises to ensure a good seal between the respirator facepiece and the face; may be qualitative (i.e. negative and positive pressure tests and those relying on personal sensory response) or quantitative (i.e. utilize a particle generator and particle counter).
fugitive emission	particulates (fumes, mists, dusts), gas or vapour that escapes from equipment, a process, or from a product.
fumes	occur when metal is heated and suddenly cooled; regarded as airborne condensation of solid particles from hot processes involving metals, e.g. welding, brazing.
gases	substances that are in the gaseous state at ambient temperature and pressure.
IDLH	*immediately dangerous to life or health*; a condition in a space where a hazardous atmosphere exists to such an extent that a person without appropriate respiratory protection could be fatally injured or suffer immediate, irreversible or incapacitating health effects.
mists	tiny liquid droplets caused by spraying or blowing operations; regarded as a particulate airborne hazard.
MOL	Ministry of Labour.
NIOSH	the American government agency *National Institute for Occupational Safety and Health* which sets safety performance standards that are world-recognized.

olfactory fatigue	diminishing sense of smell; normally occurs with continued exposure to an airborne contaminant.
particulate filters	removes particulates (dusts, mists, fumes) from workplace air.
powered air-purifying respirator	contains a blower which passes air through a filter or cartridge and then supplies air to the facepiece; suitable for people who have beards or lung disorders.
respirator	a device designed to protect the wearer from inhaling hazardous atmospheric contaminants.
SCBA	*self-contained breathing apparatus*; backpack air tanks that supply breathing air; must conform with standard CSA Z180.1.M85.
smoke	atmospheric contaminants resulting from incomplete combustion.
sorbent	the active ingredient in a chemical cartridge that removes the contaminant until its capacity is exhausted or its catalyst is poisoned.
supplied-air breathing apparatus	an air-line breathing apparatus that supplies breathing air to the wearer in accordance with standard CSA Z180.1.M85.
vapours	substances that evaporate from a liquid or solid at ambient temperature and pressure.

Requirements of the *OHSA Regulation for Industrial Establishments, Section 138*

138.(1)	*Where a worker is likely to be exposed to an atmosphere at atmospheric pressure with an oxygen content of less than 18 percent, the worker shall be protected by mechanical ventilation so that the worker's safety and health is not endangered.*
138.(2)	*Where the measures prescribed by subsection (1) are not practicable, the worker shall be protected by air supplied breathing equipment so that the worker's safety and health is not endangered.*

Policy:

1. Environmental Health and Safety (EHS) shall provide a Workplace Respiratory Protection Program for all University workplaces.

2. Supervisors shall assess the need for respiratory protection in the workplace and shall provide Environmental Health and Safety with the names of personnel to be enrolled in the Workplace Respiratory Protection Program.

3. All employees required to wear supplied-air respiratory protection shall participate in the EHS Workplace Respiratory Protection Program and should undergo annual cardiorespiratory performance evaluations.

4. All employees required to wear air-purifying respiratory protection shall participate in the EHS Workplace Respiratory Protection Program that shall include, at the employee's option, annual cardiorespiratory performance evaluations.

5. Environmental Health and Safety shall provide advice and assistance to employees and supervisors concerning respiratory protection for personnel at the main campus and at remote University workplaces. Occupational Health Services shall provide advice and/or assistance to employees and supervisors concerning cardiorespiratory performance evaluations.

6. Fit testing instruction shall be provided to employees by competent persons (i.e. University employees or consultants) who are trained and qualified in fit testing procedures.

7. Supplied-air and air-purifying respirators provided for University personnel shall be NIOSH-approved.

8. No employee shall rely upon an air-purifying or supplied-air respirator without being enrolled in the EHS Workplace Respiratory Protection Program and without receiving the training required by that Program.

9. The Workplace Respiratory Protection Program shall be reviewed annually by the workplace Joint Health and Safety Committee. The names of employees requiring air-purifying or supplied-air respirators shall be up-dated and provided to EHS by workplace supervisors.

10. Employees shall report any condition that compromises respirator use to their supervisor and/or to Environmental Health and Safety or Occupational Health Services.

Guidelines:

Respirators are worn when the workplace atmosphere is known to be contaminated and protection is required for every breath. Respirators that don't fit provide no protection!

Respiratory hazards in the workplace must first be evaluated, assessed and controlled by engineered methods before relying on the use of air-purifying respirators. Atmospheric contaminant concentrations are usually expressed in mg/m^3 for solids or particulates, and parts per million (ppm) for gases. The anticipated concentrations must be compared with MOL or ACGIH occupational exposure limits to determine potential for respiratory risk. Workplace contaminants can expose workers via inhalation, ingestion, and skin absorption. Accordingly, the need for personal protective clothing must also be assessed.

Employees who require air-purifying or supplied-air respiratory protection should be medically evaluated to ensure they are physically fit for the stresses associated with respirator use. (Cardiopulmonary function is age and health status dependent.) In order to provide adequate protection, a respirator must be suited to the hazard, properly fitted, worn correctly, and properly stored and maintained. A Workplace Respiratory Protection Program consolidates the required due diligence initiatives when reliance is placed on this critical piece of **personal** protective equipment.

Respirator Selection

Selection of the appropriate respirator will depend on the nature of the workplace atmospheric hazard, physical characteristics of the workplace, the physical demands of the task, and the capabilities and limitations of the respirators available.

The atmospheric hazard may be assessed by air sampling or by assessing the potential for exposure. Care is required when selecting respirators for contaminants that exist as particles and vapours. Generalizations about the contaminant phase are based on the ACGIH TLV listings. Low vapour pressure contaminants with a TLV listed only as mg/m^3 are assumed to exist in the particle phase and would require a particle filter. Contaminants with TLV's listed in both ppm and mg/m^3 are generally found in the vapour phase, and would require a chemical cartridge. Mixtures of contaminants in workplace air suggest that filters with aerosol and vapour removing capabilities would be required. Professional advice and assistance is essential for proper respirator selection and for correct, confident use of the recommended respiratory protection. A respirator filter and cartridge reference chart is available upon request from Environmental Health and Safety.

Assigned Protection Factors (APF's)

When a specific respirator is selected, the APF must be greater than the expected air contaminant concentration (C_{air}) divided by its exposure limit (TLV):

$$APF \geq \frac{C_{air}}{TLV}$$

For example, if the expected air concentration is 60 ppm and the exposure limit is 2 ppm, a respirator with an APF $\geq$30 must be used.

The following table illustrates values of assigned protection factors for various types of respirators based on workplace performance information:

	Respirator Type	APF
Air-purifying	• half-facepiece	10
	• full-facepiece	100
Powered Air Purifying	• full-facepiece	100 (for dust/mists)
	• hood or helmet	100 (for dusts/mists
Air-Line	• full-facepiece pressure demand	1,000
SCBA	• full-facepiece pressure demand	10,000

Canada's Respiratory Protection Standard, CSA Z94.4-93

Canada's respiratory protection standard, CSA Z94.4-93 (R1997) *Selection Care and Use of Respirators* is intended to promote the correct use of respiratory protection, not to specify performance criteria. In this regard, it defaults to NIOSH requirements. The NIOSH standards are important to respirator users because they help define selection criteria.

NIOSH Standard 42 CFR 84 (1995) for Non-Powered Particulate Filtering Respirators

After July 1998, all non-powered particulate filtering respirators used in Canada must comply with one of the nine classes of NIOSH-approved respirators. There are three basic series of filters: N, R, and P, and each series comes in three filtration efficiencies: 95%, 99%, and 99.97% at 0.3 microns where particle capture processes are least efficient. The respirator series are defined as follows:

N Series: **N**on-oil, for any dust, mist, or fume that is not an oil;

R Series: oil-**R**esistant, can be used for up to eight hours in an atmosphere containing a particulate oil or oil-based substance (e.g. lubricants, cutting fluids, glycerine);

P Series: oil-**P**roof, can be used indefinitely in an atmosphere containing oil-based contaminants.

The previous NIOSH respirator standard, 30 CFR 11 (1972), still applies to respirators worn to protect against gases (e.g. ammonia) and vapours (e.g. from evaporated fuel or solvent).

For further information about NIOSH Standards, see the web site: **www.cdc.gov/niosh**

Tips for Selecting an Air-Purifying Respirator

< Seek professional advice about respiratory protection and respirator selection.

< Seek employee input regarding comfort and fit, difficulty in breathing, and interferences with vision, communication and with other headwear or eyewear.

< Consider the ease of respirator maintenance and repair.

< Always purchase a NIOSH-approved product.

A simple filtering facepiece respirator that has no replaceable parts should be discarded when it becomes damaged, when breathing resistance increases, or when it becomes dirty or shows dirt on the inside.

Supplied-Air Respirators and SCBA's

Powered air-purifying respirators and supplied-air respirators are subject to different standards than those for particulate or gas filtering respirators; e.g. CSA Z180.1-00. Supplied-air respirators and SCBA's provide protection against oxygen deficiency and toxic atmospheres. Positive-pressure demand units protect against the inward leakage of contaminants. Extensive training is mandatory for personnel who must rely on this type of respiratory protection. Exercises with SCBA's must be conducted every three months.

Air line respirators provide no protection if the air supply fails. These respirators are therefore limited to use in places from which the wearer can escape unharmed.

Supplied-air respirators used in high and low air temperature environments may undergo serious functional changes that affect performance and safety. Users must be aware of such limitations and are urged to seek professional assistance.

Elements of a Workplace Respiratory Protection Program

The following information will be documented for the Workplace Respiratory Protection Program co-ordinator in EHS:

a) the name of the workplace that requires employees to wear respiratory protection.

b) the names of all employees requiring air-purifying or supplied-air respirators and nature of the workplace atmospheric hazards (e.g. dusts, fumes, mists, vapours, gases, oxygen deficiency);

c) the names of employees requiring/requesting annual medical reviews (i.e. cardiorespiratory performance evaluations to assess fitness for respiratory usage);

d) the NIOSH-approved respirators selected in accordance with the applicable CSA standard and the dates of formal fit testing initiatives. (Note: fit tests must be conducted while all pieces of on-the-job head and face protection are worn to ensure that there are no interferences with the face-to-facepiece seal.)

e) initial training and annual retraining for respirator users about:

- workplace hazards;
- the atmospheric concentrations of workplace contaminants;
- MOL or ACGIH occupational exposure limits (e.g. TWAEV, STEV);
- type of respiratory protection specific for the hazards;
- limitations of the type and size of personal respiratory protection selected;
- instructions concerning inspections of the respirator;
- instructions concerning donning the respirator;
- instructions about positive and negative fit testing by the user;
- wearing the respirator, breathing resistance, and sensory indications;
- instructions concerning removing the respirator and cleaning it;
- procedures for maintenance, repair, and storage of personal respirators;
- emergency instructions should respirators malfunction.

f) precautions concerning personal factors that can influence the safe and confident use of air-purifying respirators (e.g. you change or begin wearing eyeglasses, you grow a beard or sideburns or shave them off);

g) the schedule for program evaluations by supervisors, affected employees and workplace joint health and safety committee personnel.

Field Work

Effective: September 2000

Vice-President,
Finance and Administration

Applicable Legislation
Occupational Health and Safety Act (OHSA), R.S.O. 1990, Section 27(2)(c)
Fish and Wildlife Conservation Act and Regulations, 1999

Intent: To define responsibility for safety and risk management in field work, to promote self-reliance and preparedness for field activity, and to outline requirements for communications between field workers and the University. Considerations for personal care and safety and environmental responsibility in the field are summarized.

Definitions:

buddy system a system of organizing employees into work groups so that each employee of the work group is designated to be observed by at least one other employee in the work group.

field safety officer the employee who exercises OHSA supervisory responsibility for field work and co-ordinates health and safety in the field.

field work work or study at remote and/or outside locations which warrant special considerations for risk management (e.g. personal accident insurance) and supervisory due diligence (e.g. training for specific field hazards, buddy systems, emergency and survival preparedness, pre-arranged schedules for communications).

Requirements of the *Occupational Health and Safety Act, Section 27(2)(c)*

27.(2)(c) *a supervisor shall take every precaution reasonable in the circumstances for the protection of a worker*.

Policy:

1. Departments planning or undertaking field work shall establish their own internal procedures to review field work organization and safety preparedness prior to the commencement of travel for field activity. This review shall include an assessment of supervisory due diligence, safety instructions, workers' compensation coverage for each person in the field crew, and the need for personal accident and liability insurance.

2. The Department Chair, Administrative Head, or Director shall authorize all field work arranged by personnel within his/her organization. Documentation shall be copied to the Risk and Insurance Manager and shall be retained for seven years.

3. One member of the field party shall be appointed as field safety officer and his/her authority and responsibility shall be defined and explained to all members of the field crew.

4. Departments planning or undertaking field work shall issue detailed safety instructions to field personnel. These instructions shall address the specific occupational hazards associated with the activity and the required due diligence. (The health and safety considerations identified in the Guidelines section of this policy will be helpful in ascertaining this due diligence.)

5. Departments planning or undertaking field work shall provide activity-specific training for all field work personnel (e.g. first aid and CPR qualification, off-road vehicle use and safety, boating or canoeing skills, etc.)

6. Survival skills training shall be provided for all personnel venturing into remote or risk-prone areas (e.g. mountainous regions, avalanche zones, ice floes or ice fields, volcanic regions, caves, tundra, deserts, other areas of extreme environmental conditions, etc.).

7. All special training shall be documented by the field safety officer and shall be reviewed prior to the field trip.

Guidelines:

Thorough planning and preparation are essential for field safety since a wide range of activities, environmental conditions and occupational risks and hazards can challenge field work personnel. Many accidents in the field can be associated with insufficient preparation by field personnel who face the challenges and risks of the natural environment. The field safety officer must co-ordinate risk management initiatives in advance of and during field work activities. The following considerations are intended to promote actions for self-reliance and preparedness for field activity.

Insurance Coverage

Consult the Office of the Risk and Insurance Manager about the coverage provided by the University's property and general liability insurance policies. The requirement for any supplementary or special insurance (e.g. for boats, air travel, etc.) shall be identified. The need for personal accident insurance and vehicle insurance must also be discussed.

General information about insurance coverage may be found at the University's web site **www.fin.uoguelph.ca/Manuals/Manuals.HTM**, numbers TR.20 and TR.21.

Communications

Communication between field workers and the University is essential for safety reasons. The following recommendations may be appropriate for University-sanctioned field excursions:

< Leave an itinerary with the Administrative Officer in the department, preferably including phone numbers and times when people may exchange messages (if possible).

< Don't go into a new area or region "cold". Talk to someone who has worked there before to obtain helpful information to adequately prepare for the field work.

< Inform others (locally) of your daily travel plan, and leave them notes and maps. Detail your planned route and possible alternate routes. Specify the expected time and date of arrival at a destination and your return to base camp.

< Work in pairs rather than alone when in dangerous or remote areas, or when one of the individuals is inexperienced.

< The expedition leader and/or field safety officer must evaluate the training, preparedness and survival skills of the field party, must be a qualified first aider, and must be aware of any unique medical condition of each field worker (e.g. allergic reaction to insect stings, ailments, medications, circumstances that might cause onset of symptoms etc.) Expedition leaders should consult Occupational Health Services about obtaining Certificates of Fitness from field workers.

< All personal injury incidents must be reported to the University at the earliest opportunity. (See Safety Policy 851.04.02 concerning Injury and Incident Reporting.)

< In remote areas, dependable radio or satellite communication and backup are essential. Establish contact with local expediters, R.C.M.P., forestry or other officials so that your timetable and whereabouts are known locally. A personal locator beacon and GPS device may be required.

< If a badly injured excursion member needs medical evacuation, know:

- who to telephone for a medical evacuation;
- location of nearest medical facility to which evacuation would proceed;
- who to contact for medical advice and who to advise of your situation;
- location of the nearest available fixed-wing or helicopter aircraft, and how to contact the service in an emergency.

< Anticipate the effects that an injured member might have on the success of your excursion.

< A listing of emergency numbers for the nearest medical facility, R.C.M.P, government officials, and air transportation should be carried by all members of the field party.

Canadians travelling abroad often assume they can a phone effortlessly to Canada. If you bypass foreign operators and hotel telephone systems by using a calling card, you should avoid hassles and unexpected service charges. Call 1-800-561-8868 or visit **www.bell.ca/callcard** for information about international calling with *Canada Direct* service.

Environmental Issues

Care of the environment requires knowledge of possible effects of intrusion. Issues which should be addressed in planning a field excursion include:

air: Emissions and noise can disturb wildlife and humans.

animal wildlife: Care should be taken to avoid adversely affecting the nesting, feeding and migration of animal wildlife. Contact the Ministry of Natural Resources about Ontario's Wildlife Management Units and hunting regulations.

archeological: Archeological sites are of historical or cultural significance. If a suspected site is encountered do not alter the site. Proper authorities should be informed of the location.

aquatic life: Consider noise and boat speed effects on aquatic life. Federal and provincial laws regulate fishing. Contact the Ministry of Natural Resources for details.

cultural and subsistence:	Local customs, traditions and religious beliefs should be considered when and planning and conducting a field excursion. Communication with area residents can often minimize concerns.
erosion:	Altering surface conditions can change the rate and pattern of the erosion process.
vegetation:	Accessing an area may disturb vegetation and may result in erosion. Cutting vegetation can affect feeding and nesting of animal wildlife.
waste:	Waste materials include petroleum products and solvents, general camp wastes such as food, trash and sewage, and equipment wastes. Wastes will require transportation to an authorized recycling or disposal facility.
water:	Surface and groundwater should be safeguarded by careful practices in the field.

The transportation and safe use of hazardous materials for field work activities may present concerns. Consult the Hazardous Materials Safety Officer in Environmental Health and Safety for assistance. See Safety Policy 851.08.10 concerning Transportation of Dangerous Goods.

Field Site Hazard Assessments

- Identify possible hazards unique to the locale of the field work (e.g. insects, altitude, wildlife, temperature extremes, diseases, etc.);
- Consult with local officials responsible for wildlife management, site access control, etc;
- Develop plans to avoid hazards and manage risks;
- Develop plans to deal with emergencies (e.g. bear-repellent, survival and safety equipment);
- Consider the use of a personal locator beacon and GPS device if you plan an extended visit into a wilderness area;
- Consider risk management initiatives appropriate for boating, scuba diving (see *O.Reg 629/94, Diving Operations*), use of firearms, work in extreme climates, etc. Some excursions may require the services of an experienced field guide. (Environmental Health and Safety has reference material on field work safety precautions.)

Health Protection (also, see Safety Policy 851.13.04)

< Country-specific health protection recommendations are available from:

- Occupational Health Services
- Wellington-Dufferin-Guelph Health Unit (821-2370)
- World Health Organization, **www.who.int/en**
- U.S. Centres for Disease Control and Prevention, **www.cdc.gov/travel**
- International Association for Medical Assistance to Travellers (IAMAT) **www.iamat.org**

< Plan prevention for diarrhea and water and food-borne diseases:

- *cholera* - a bacterial enteric disease causing severe diarrhea
- *hepatitis A* - a viral disease that is vaccine preventable
- *schistosomiasis* - a parasitic disease causing diarrhea, not vaccine preventable
- *typhoid fever* - a Salmonella bacterial infection that is vaccine preventable

< Plan prevention for insect-borne diseases:

- *dengue fever* - a mosquito-transmitted viral disease for which there is no vaccine
- *Japanese encephalitis* - a mosquito-transmitted viral infection that is vaccine preventable
- *Lyme disease* - a tick-borne spirochaetal disease that is now vaccine preventable (consult your physician about LYMErix)
- *malaria* - a mosquito-transmitted parasite infection that is usually preventable with anti-malarial medication
- *tick-borne encephalitis* - a European viral infection transmitted by tick bites, vaccine preventable

- *yellow fever* - a mosquito-transmitted viral infection that is vaccine preventable

< Plan prevention against blood-borne diseases:

- *AIDS* - a sexually-transmitted viral infection that is not vaccine preventable

- *hepatitis B* - a viral infection that can cause chronic liver disease, vaccine preventable

< Plan prevention against zoonotic diseases:

- *hantavirus* - a viral disease transmitted via the droppings of deer mice and other rodents, not vaccine preventable

- *rabies* - a viral disease transmitted by animal bites, vaccine preventable

Mosquitos, Black-flies, Ticks and Stings

Mosquitos and black-flies thrive in hot and humid weather and are attracted to humans because we give off heat and moisture and carbon dioxide. Peak biting periods for mosquitos are dawn and dusk. Black-flies only bite during daylight hours. These insects will generally be less bothersome in the direct sunlight and on windy days.

To protect yourself from these annoying biting insects, wear loose-fitting, light-coloured clothing with long sleeves and high collars. Hats with mosquito netting will protect your face and neck. Repellents that contain 30% DEET (N-diethyl metatoluamide) are most effective when applied lightly and evenly and in accordance with the product's directions. (Check the "Bug Forecaster" on the web site**:** **www.muskol.com**.)

The ticks which spread Lyme disease by feeding on humans and domestic animals and deer live in brush, woods and tall grass. The geographic areas where they are most prevalent are the northeastern and north-central United States. Symptoms of bites vary among individuals and include flu-like illness and rashes or spots about the affected area. In rare cases, chronic Lyme disease can damage the nervous system and joints. Precautions include wearing long pants and long-sleeved shirts that are worn tucked-in. Repellent containing permethrin should be sprayed near the openings on clothes and repellents containing DEET should be used sparingly on skin. Check for tick bites on skin and under hair at the end of every day. If a tick is found on the skin, it should be removed with tweezers, killed in alcohol, and saved. Report to a physician if your suspect you have been bitten.

Stings from bees and wasps can cause allergic reactions, the most serious being anaphylaxis. Personnel who are susceptible to such conditions should consult a physician or pharmacist for health care advice.

Medical Care Abroad

< Consult Occupational Health Services about your business-related travel medical needs and contingencies.

< The International Association for Medical Assistance to Travellers (IAMAT) maintains a list of approved physicians in most countries. Visit **www.iamat.org**

< When planning travel abroad, investigate the travellers' health section of the Atlanta-based Centers for Disease Control and Prevention at **www.cdc.gov**. This site contains information about health risks to travellers and offers appropriate advice.

Weather Information

Weather forecasts for all of Canada including marine forecasts are posted on the Environment Canada web sites: **www.msc-smc.ec.gc.ca**

www.ec.gc.ca.

Weatheradio is a service of Environment Canada which transmits weather information on frequencies 162.4 to 162.55 MHz. Weatheradio receivers can be purchased for field use within approximately 60 km of a transmitter. Contact Environment Canada for details and locations of transmitters.

Self-help advice to prepare for severe weather is available on the SAFE GUARD internet web site: **www.safeguard.ca**

Also, see Safety Policy 851.09.03 concerning Occupational Exposure to Sunlight.

Marine Charts

Marine charts are available (for nominal fees) from:

Hydrographic Chart Distribution Office
Departments of Fisheries and Oceans
1675 Russell Road
P.O. Box 8080
Ottawa, Ont. K1G 3H6
(Tel: 613-998-4931, FAX: 613-998-1217; internet: **www.charts.gc.ca**)

Avalanche Information

Avalanche information is available from the Canadian Avalanche Association, c/o:

The Canadian Avalanche Centre
P.O. Box 2759
Revelstoke, B.C. V0E 2S0
(Tel: 250-837-2435, FAX: 250-837-4624; internet: **www.avalanche.ca**)

The Canadian Avalanche Centre compiles avalanche risk information using meteorological data from Environment Canada and field reports from ski resort operators and search and rescue authorities. An average of 10 people per year are killed in Canada by avalanches.

Travel or Operations Over Ice

Ice surfaces are used for transportation routes and as surfaces on which structures are erected. Safety information concerning fresh water ice formation and its use is available in the following publications:

Publication CL1-7-71
Freeze-up and Break-up Dates of Water Bodies in Canada
Information Section
Central Service Directorate
Atmospheric Environment Services
Environment Canada

Technical Memorandum No. 56
The Bearing Strength of Ice
National Research Council

Research Paper No. 469, NRCC 11806
Use of Ice Covers for Transportation
National Research Council

Information and advice may also be obtained from the National Research Council of Canada, Division of Building Research, Geotechnical Section, Ottawa, Ontario K1A 0R6.

Food Safety

For information on food-borne illness, food safety, and safe food handling tips, visit the Canada Food Inspection Agency web site at **www.cfia-acia.agr.ca**., or that of Agriculture and Agri-Food Canada, **www.agr.ca**.

Fish and Wildlife Conservation

For information about fish and wildlife conservation and hunting regulations in Ontario, contact the Ministry of Natural Resources (MNR):

MNR Information Office, Toronto, Telephone: 416-314-2000.

MNR web site: **www.mnr.gov.on.ca/MNR/**

Restricted Fire Zones in Ontario

The Ministry of Natural Resources will, under extreme forest fire risk conditions, declare the establishment of *Restricted Fire Zones*. It is illegal to set and use a fire for any purpose within the boundaries of a Restricted Fire Zone. For further information about Restricted Fire Zones, contact the local office of the Ministry of Natural Resources.

Firearms

The acquisition and registration of firearms and the licensing of gun owners is regulated by the Federal Government under *The Firearms Act*. All new firearms applicants must pass the Canadian Firearms Safety Test, and all firearms must be registered by 2003. Further information is available at postal outlets and by phoning 1-800-731-4000. Firearm ownership and use for University business shall be reported to the University's Security Services. (See Safety Policy 851.07.12 concerning Firearms.)

Roadside Assistance

Consider how available roadside assistance will be if your vehicle breaks down. A GPS device may be essential if the field work involves off-road travel. Determine an action plan and contingencies in advance for mechanical failures of your vehicle.

Related Safety Policies

See Safety Policy 851.01.14 concerning Risk Management, Safety Policy 851.06.23 concerning Field Trips, and Safety Policy 851.07.11 concerning Boats and Watercraft.

Web Sites of Interest:

www.parkscanada.gc.ca
www.princeton.edu/ ~ oa

Last updated September 2002

Safety Orientation and Training

Effective: September 2000

Vice-President,
Finance and Administration

Applicable Legislation:
Occupational Health and Safety Act (OHSA), R.S.O. 1990, Sections 25(2)a, 42(3)

Intent: To outline the University's requirements for safety orientation and training for employees and students.

Requirements of the *Occupational Health and Safety Act (OHSA), sections 25, 27*

Duties of Employers, Section 25(2)

(a) provide information, instruction and supervision to a worker to protect the health or safety of the worker;

(d) acquaint a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent;

(h) take every precaution reasonable in the circumstances for the protection of a worker.

Duties of Supervisors, Section 27(2)

(a) advise a worker of the existence of any potential or actual danger to the health or safety of the worker of which the supervisor is aware;

(b) where so prescribed, provide a worker with written instructions as to the measures and procedures to be taken for protection of the worker; and

(c) take every precaution reasonable in the circumstances for the protection of a worker.

Policy:

1. Academic departments and administrative units of the University shall provide safety orientation and training for employees and students.

2. Activity-specific orientation training shall be provided at the outset for new employees and students, and refresher training shall be conducted at an appropriate frequency.

3. Departments and administrative units of the University shall design their own employee/student orientation and training record sheets.(Examples are appended.) Training records shall be maintained.

4. Safety training initiatives shall be documented and communicated regularly to the departmental (local) joint health and safety committee. The committee shall review such initiatives at least annually in accordance with *OSHA Section 42(3)*.

Guidelines:

Training is an essential component of an employer's health and safety obligations. Request feedback from employees and students for continuous improvement to your orientation program. Consult Safety Policy 851.01.06 about the required formal certification courses for employees and EHS web site **www.uoguelph.ca/HR/ehs/training.htm.**

Suggested List of Orientation Topics

< *OHSA* and *Regulations*
< University of Guelph Health and Safety Policy 851.01.01 and the University's Safety Policy Manual
< Identify the Safety Committee, supervisory and safety personnel, qualified first aiders, CPR-trained people, and show the location of the local safety bulletin board
< Explain Employee Rights, Duties, Responsibilities
< Workplace Safety Standards and Safety Procedures
< Workplace Hazards and Controls
< Emergency Procedures and Incident Reporting
< Resource personnel, resource materials, and web sites
< WHMIS, MSDS, and personal protective equipment (PPE)
< Training opportunities; refresher training
< Workplace Inspection Program
< Safe Science (see the web site created for the Howard Hughes Medical Institute on "Knowing How to Practice Safe Science" at **www.practicingsafescience.org**.)
< Agricultural Health and Safety (see the manual prepared by Research Station Operations).

Young Worker Safety Awareness

The Workplace Safety and Insurance Board has developed a safety awareness program for young people new to a workplace. The program may be found at: **www.yworker.com**

New Employee or Student Safety Orientation Checklist

Employee/Student Name _____

Date _____

Department _____ Supervisor _____

FOLLOWING TOPICS HAVE BEEN DISCUSSED AND FULLY EXPLAINED:

2. Introduction

University Health and Safety Policy, 851.1.01 _____
Occupational Health and Safety Act (OHSA) _____
Safety Administration at the University of Guelph _____

3. Resource People in the Workplace

4. Emergency Procedures

Medical emergency: First Aid, Injury/ Incident Report _____
Fire: fire alarm, fire extinguishers, evacuation routes _____
Chemical spill preparedness and response _____

5. Equipment in the workplace

Equipment hazards, standard operating procedures for laser, lathe, vacuum system, etc. _____

6. Chemical Hazards - WHMIS

Type of chemical hazard (flammable, etc.) _____
Storage _____
Handling _____
Waste disposal _____

7. Physical Hazards

e.g. Radioactivity _____
Electrical hazards _____
Heat / cold / noise _____

8. Biohazards

Nature of biohazard (microorganism, cell line) _____
Handling _____
Personal protection _____
Spills / disposal _____

9. Hazard Controls

Engineering _____

Personal Protective Equipment _____

10. Other Orientation Topics

e.g. field trip _____

11. Required Certification Courses

e.g. diving, forklift, confined space, first aid, CPR, pesticide applicators licence, etc. _____

11. Other Training Opportunities _____

12. Have any written job/task instructions of hazardous operations been issued:

If yes specify for which job / task _____

Employee's/ Student's Signature _____

Trainer's Signature _____ Date _____

EMPLOYEE SAFETY TRAINING RECORD

NAME:_____

Instruction / Course	R	O	Type	Testing Required YES or NO	Trainer's Name	DATE

R = required **O** = optional **Type** e.g. Video, seminar, hands-on

Other information:

Hazardous Waste Management

Effective: September 2000
Review Date:
Revised Date: January 2011

N. Sullivan

Vice-President,
Finance and Administration

Applicable Legislation:

Environmental Protection Act and Regulations:

- Environmental Protection Act, R.S.O. 1990, c. E.19
- General— Waste Management - R.R.O. 1990, Reg. 347
- Ozone Depleting Substances - General - R.R.O. 1990, Reg. 356
- Refrigerants – O. Reg. 189/94
- Solvents - O. Reg. 717/94
- Waste Management — PCB'S - R.R.O. 1990, Reg. 362

Nuclear Safety and Control Act and Regulations:

- Nuclear Safety and Control Act, (1997 c.9)

Transportation of Dangerous Goods Act and Regulations:

- Transportation of Dangerous Goods Act
- Transportation of Dangerous Goods Clear Language Regulations

Local Sewer Use By-Law (Municipal)

- City of Guelph Sewer Use (1991)-13791

Relevant Guideline:

- Guideline C-4, The Management of Biomedical Waste in Ontario

Intent:

To ensure that all hazardous wastes originating from University activities are managed and disposed of using environmentally responsible practices in accordance with all applicable legislation while protecting the health and safety of the University of Guelph community including employees, students, visitors and contractors.

Policy:

- All uses of the University of Guelph's Waste Generator Numbers will be done under the guidance, and with the approval of EHS.
- The University will have a Hazardous Waste Management Program administered by EHS comprised of the following elements:
    - Identification and communication of responsibilities to relevant parties;
    - Provision of minimum standards required for selection of hazardous waste removal contractors;
    - Assignment of financial responsibility for hazardous waste disposal;
    - Provision of information and training;
    - Identification of hazardous waste streams;
    - Management of regulatory obligations; and
    - Specific programs and procedures for the regular disposal of hazardous wastes including:
        - Chemical wastes;
        - Biohazardous wastes shipped offsite;
        - Radioactive wastes;
        - Miscellaneous hazardous wastes including batteries, fluorescent bulbs, and PCBs (including PCB containing equipment).

Glossary of Terms

EHS – Environmental Health and Safety department

PCB – Polychlorinated biphenol compounds

Waste Generator Number – a number issued by the Ministry of the Environment for generators of hazardous waste. Registration of waste streams and hazardous waste removals from University of Guelph locations are tracked through the Hazardous Waste Information Network (HWIN) using the applicable waste generator number.

Laboratory Safety

Effective Date: January 2011
Review Date:
Revised Date:

W. Sullivan
Vice-President,
Finance and Administration

Responsible Department: Environmental Health and Safety

Applicable Legislation/Standards:

Ontario Occupational Health and Safety Act and Regulations:

- Occupational Health and Safety Act, R.S.O. 1990, c. O.1
- Industrial Establishments - R.R.O. 1990, Reg. 851
- Control of Exposure to Biological or Chemical Agents - R.R.O. 1990, Reg. 833
- Workplace Hazardous Materials Information System (WHMIS) - R.R.O. 1990, Reg. 860

Environmental Protection Act and Regulations:

- Environmental Protection Act, R.S.O. 1990, c. E.19
- Ozone Depleting Substances - General - R.R.O. 1990, Reg. 356
- Solvents - O. Reg. 717/94
- General — Waste Management - R.R.O. 1990, Reg. 347
- Waste Management — PCB'S - R.R.O. 1990, Reg. 362

Intent:

The University of Guelph is committed to protecting the health and safety of its community including employees, students and visitors. This policy establishes the expectations and requirements applicable to laboratory safety at the University of Guelph and is intended to assist in the prevention of accidents, injuries and diseases in the laboratory.

Policy:

- All work performed within research, teaching and service laboratories be conducted in a safe manner in accordance with all applicable legislation and the University of Guelph's Heath and Safety policies and programs.
- The University will have a Laboratory Safety Program administered by EHS comprised of the following elements:
    - Identification and communication of responsibilities to laboratory supervisors and personnel;
    - Provision of information and training;

- Provision of written lab safety and emergency procedures;
- Use of appropriate safety equipment;
- Use of appropriate personal protective equipment;
- Requirement for proper disposal of hazardous wastes;
- Requirement for prompt reporting of incidents involving laboratory work;
- Provision for auditing the implementation and effectiveness of the program;
- Requirement for thorough consideration of health and safety aspects during the design, construction, renovation or decommissioning of a laboratory or chemical storage area.

This policy applies to all personnel supervising and/or performing work in research, teaching and service laboratories of the University of Guelph.

Glossary of Terms:

EHS – Environmental Health and Safety

laboratory – for the purposes of this policy, a laboratory is considered to be any space where scientific research, experimentation or analysis is conducted. Computer "labs" are excluded from this definition.

research laboratory – a laboratory designed with a primary research function.

service laboratory – a laboratory providing contracted analysis or experimental procedures for another agency either within or outside of the University for a fee e.g. Laboratory Services Division.

teaching laboratory – a laboratory designed with an instructional function correlated to a University course, to teach groups of students.

512 Hazardous Weather / Emergency Closing Procedures, All Staff

Authority to Close the University

The authority and responsibility for closing the University rests with the President or designate. In the absence of the President, the responsibility for closing the University shall rest with the next available officer in the following sequence:

Provost and Vice President (Academic)
Vice President (Finance and Administration)
Associate Vice President (Academic)
Associate Vice President (Student Affairs)

Although these procedures have been developed primarily for closings as a result of hazardous weather conditions, they will also be followed in the event of any other conditions that require the closing or evacuation of the University.

While every effort will be made to conduct thorough consultations before a closing decision is made, where hazardous weather conditions or other emergency circumstances pose an obvious risk to public safety, some consultations provided in this policy may be eliminated in the interest of a speedy and efficient closing decision.

Whenever possible, if a decision is to be made about closing before normal business hours, every effort will be made to render a judgment on the matter by 6:30 a.m. to allow public communication of the decision by 7:00 a.m. If the University must close during normal business hours, every effort will be made to communicate the decision so as to provide a one hour lead time to ensure the orderly cessation of operations.

With the exception of those essential services listed in Appendix I, the closing will be final and not left to the discretion of individuals or departments unless special arrangements are made with the President or designate and the University of Guelph Campus Community Police. Only those employees who have been notified in advance by their supervisors that they are essential workers for the purposes of this policy are expected to report to work.

The President (for operations reporting directly to the Office of the President) and each Vice-President will be responsible for ensuring the preparation of telephone contact trees that can be utilized in emergency closing situations to communicate decisions concerning the closure or curtailment of normal University operations. The development of phone trees should incorporate, as appropriate, the need to contact non-University operations located on campus (e.g. external retail and professional service providers located in the University Centre), student and employee organizations with their own staff, and volunteers (e.g. Campus Safe Walk, First Response Team). Each Vice-President will be responsible for ensuring these telephone trees are current and activated appropriately when this policy is implemented.

In all cases where this policy identifies a particular University administrator, this will apply to the administrator or his/her designate at the time the policy is being implemented.

Section A - Steps Leading to a Decision Concerning Closure of Guelph Campus

1. The on-duty Campus Community Police Sergeant or Senior Constable will monitor:

- road, parking lot and sidewalk conditions in consultation with the Grounds Manager or designate
- the weather forecast through the University website weather link
- City school and other organization closures broadcast by CJOY 1460 AM or Magic 106.1 FM
- road conditions and closures with a focus on Highway 6, 7, and 401 through the MTO website www.mto.gov.on.ca/english/traveller/conditions/southwestern.html
- Guelph Transit operational status as communicated to the Campus Community Police Dispatch.

If the above information indicates that conditions are such that closure should be considered, the Sergeant or Senior Constable will contact the Director, Campus Community Police or designate at 5:30 am with advice regarding the curtailment of University operations due to hazardous weather conditions or other emergency conditions.

2. The Director, Campus Community Police or designate will then telephone the Executive Director, Physical Resources or designate with a preliminary assessment of hazardous weather conditions. The Director, Campus Community Police and the Executive Director, Physical Resources or their designates will consult with relevant contacts as possible given the time of day and particular circumstances.

The Director, Campus Community Police will gather information regarding weather and road conditions from the following sources:

- Canadian Automobile Association (CAA)
- Environment Canada
- Guelph City Police
- Ministry of Transportation
- Ontario Provincial Police
- Guelph Transit Commission

The Executive Director, Physical Resources or designate will determine (a) whether other educational institutions in the City of Guelph are closing and (b) whether there is other relevant information available from other agencies or institutions, including:

- Conestoga College (Guelph Campus)
- University of Waterloo
- Wilfrid Laurier University
- Upper Grand District School Board
- Wellington Catholic District School Board

After consulting with the Executive Director, Physical Resources, and if closure is being recommended, the Director, Campus Community Police will call and advise the Vice-President (Finance and administration) by 6:00 am. The Vice-President (Finance and Administration) will be responsible for advising the President of hazardous weather conditions by 6:30 am.

When there is appropriate lead time and circumstances warrant, consideration will be given to issuing an advisory on the University home page regarding a "weather watch" (or other emergency situation)

that is being monitored for impact on the University's normal operations. The Vice-President (Finance and Administration) will work with the Director, Communications and Public Affairs to prepare and issue an appropriate message in these circumstances. (See Appendix II for sample messages.)

When a weather watch or other emergency condition develops during regular business hours, the Director, Communications and Public Affairs or designate will endeavor to inform organizers of any special events or large gatherings listed on the University web calendar if a decision to close the University appears likely. As time permits, the Director, Communications and Public Affairs will consult organizers about any special problems that might be caused by cancellation or postponement.

3. If the President decides to close the University, the decision will include, when possible, an indication of when the University expects to reopen. The President will inform the Vice-President (Finance and Administration) of the decision. The Vice-President (Finance and Administration) will, in turn, advise the Executive Director, Physical Resources, the Director, Communications and Public Affairs and each of the Vice-Presidents.

In the case of a decision to close the University it is also the President's decision, based on input and/or consultation with the appropriate Vice-President, whether special arrangements for selected University operations to remain open will be allowed. This decision shall be communicated to affected operations and to Campus Community Police by the appropriate Vice-President.

The Director, Communications and Public Affairs will initiate communications concerning closure of the University and will serve as the official University spokesperson with media concerning the closure. The Executive Director, Physical Resources will advise the Director of Campus Community Police, and they will proceed to work together on operational matters throughout the closure of the University. Each Vice-President will proceed to advise their operations of the closure decision using their telephone tree contact lists.

4. Once a decision is made to close the University, the Director, Communications and Public Affairs is responsible for pursuing the following in a timely manner, as best as can be done in the circumstances, and consistent with the provisions of this policy:

- post the closure message on the University home page (see Appendix II for sample messages)
- ensure that the University telephone greeting is changed when closure occurs during the regular business day, send a notice of closure on the University of Guelph telephone notification system
    - when closure occurs prior to the university opening, send a notice of closure to all student residences on the University of Guelph telephone notification system
    - contact the following radio and television stations:

        CJOY, 1460 AM; MAGIC, 106.1 FM, Guelph
        CBC, 99.1 or 89.1 FM, Toronto
        CHYM, 96.7 FM, Kitchener; 570 AM News Talk
        CFRU, 93.3 FM, Campus
        K LITE, 102.9 FM, Hamilton
        CHUM, 104.5 FM, Music; 1050 AM, Music
        CFCA, 105.3 FM, Kitchener
        Country 95.3; Y108, CHML, Burlington

Z103.5 and 88.5 FM, Etobicoke
Q 107, Toronto
102.1 The Edge
MIX, 99.9 FM, Toronto
Newstalk 1010 CFRB, 1010 AM
CKCO TV, Kitchener
CITY TV, Toronto (Cable Pulse 24)
CH TV, Hamilton

Messages left on the switchboard, posted on the University web page, on library terminals and elsewhere will all advise students, faculty and staff to monitor local radio and television stations.

The Director, Communications and Public Affairs will ensure that the home page, switchboard, library and other closure messages are up-dated as required. The Director, Communications and Public Affairs will also be responsible for checking the day's agenda via the University web calendar to determine what special events and large campus gatherings are planned that may be affected and communicate the closing decision where possible. These contacts by the Director, Communications and Public Affairs should be reinforced and supplemented through the implementation of the telephone trees from each of the Vice-Presidents' offices communicating any decision to curtail University operations.

5. The Director of Campus Community Police will ensure that notices are posted concerning the closure at all main entrances to University buildings and ensure that these signs are removed at appropriate times. (The notices will include a note advising people to monitor local radio and television stations.) Campus Community Police will also advise City of Guelph Transit of the closure of the University.

Section B - Closure of U of G Operations Outside of Guelph

Since weather conditions may vary across the province, the Dean, Ontario Agricultural College (OAC), and the Vice-President (Research) will be responsible respectively for ensuring that the three regional campuses of OAC and the Research Stations outside Guelph have emergency closing procedures in place.

For Research Stations managed from Guelph (Woodstock, Arkell, Guelph, Ponsonby, Elora, Alma, Vineland, Simcoe and Kettleby), the Manager of Research Station Operations (RSO) in consultation with the local unit managers, will advise the Vice-President (Research) regarding hazardous weather conditions, including roads being closed by the OPP or other authority, or other emergency conditions that affect the operation of the Stations. Measures being taken to care for the livestock, as well as for the provision of other essential services at the Research Stations, will be reported to the Vice-President (Research). The Manager, RSO, will relay any instructions from the Vice-President (Research) to the appropriate Unit Managers.

The Chief Executive Officer of the University of Guelph-Humber (U of G-H) will ensure that emergency closing procedures are in place for U of G-H.

In all cases, the Dean/Vice-President/CEO will advise the President whether a closing decision should apply in some or all of these areas. If a decision is made to close, the Dean/Vice-President/CEO will inform the University's Director, Communications and Public Affairs of the decision and determine whether any related communications are needed at the University's main campus.

Appendix I - Services Deemed Essential

The directors of the following units are responsible for ensuring that appropriate levels of service are continued and for identifying the essential staff necessary to provide services and notifying these individuals in advance:

Animal Care Services
Animal Units at all campuses (e.g., Aqualab, regional colleges)
Campus Community Police
Computing and Communications Services
Communications and Public Affairs
Hospitality Services
Laboratory Services Division
Off-Campus Research Stations
Physical Resources
Student Health Services
Student Housing Services
Telecommunication Services / Switchboard
Veterinary Teaching Hospital

Employees designated to provide these essential services should be notified by their supervisors. All employees in a unit would not normally be deemed essential. When time permits, a reminder should be provided to these employees when a weather watch is in effect.
Only those employees identified by their supervisors as essential for the purposes of this policy are expected to report to work in case of a closure of the University.

Appendix II - Suggested Messages

Although it is difficult to predict the exact situation that may arise, the following two messages illustrate the sequence of announcements that could be used in a weather-related University closing situation:

Sample Message 1 - Weather Watch
As of (date/time) the University is open and we are continuing to monitor weather conditions. Any decision to close will be posted on our web page prior to 7:00 a.m. Faculty, staff and students are advised to use public transportation for safety reasons and because the availability of cleared parking spaces may be limited.

Sample Message 2 - University is Closed
Time and Date: The University has adopted weather emergency procedures and is closed. Classes and examinations are cancelled for (day/month/year). Only those employees who have been identified by their supervisors as essential workers are requested to report to work. Students, staff and faculty are advised to monitor local radio and television stations and the University home page for updates.
