



DEPARTMENT OF  
**ANIMAL  
BIOSCIENCES**



# **SAFETY & ORIENTATION MANUAL**

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# **SAFETY & ORIENTATION**

## **1. Introduction**

"Take every precaution reasonable in the circumstances for the protection of the worker." Safety is everyone's responsibility and YOU are responsible for your own work area. (Due Diligence, Appendix F)

## **2. Orientation**

Health and Safety in Ontario is regulated through the Occupational Health and Safety Act (OHSA) (Oct. 1, 1979) and its Regulations. This provides a framework for health and safety in Ontario workplaces using the internal responsibility system. The OHSA requires that employers have a joint health and safety committee, as well as health and safety policies and programs. In addition, the Act makes officers of a corporation directly responsible for health and safety, and imposes general and specific duties on workplace parties. The OHSA incorporates by reference provisions of regulations and codes under other acts (e.g. Fire Code, Building Code, Transportation of Dangerous Goods, Worker's Compensation).

The purpose of orientation is to make the workplace safer by providing information (new or forgotten) and to comply with the OHSA regulations regarding an employee's right to know about hazards and receive safety instruction, as well as due diligence, and personal protective equipment [OHS Act, 25, 2a; 27, 2(a, b, c)].

Be alert for unsafe practices & correct them if possible - get assistance if necessary!!

### **3. Safety Administration Structure at the University of Guelph:**

University Health and Safety Policy, 851.01.01

Environmental Health and Safety

Occupational and Student Health Services

Central Health and Safety Committee

Local Health and Safety Committees

Duties of employers, supervisors, and workers as covered under the OHSA

### **4. Categories of Hazards:**

Chemical (flammable chemicals, toxic gases, etc.)

Biological (bacteria, viruses, parasites, fungi, toxins, human bodily fluids, cell lines)

Physical (radiation, noise, heat/cold, ventilation)

Ergonomic design of the workplace

### **5. Department of Animal Biosciences Guidelines:**

Refer to [Appendix E](#).

### **6. Basic Good Laboratory Practices:**

- Obtain (and read) MSDS sheets pertaining to your work - ASK QUESTIONS if you are uncertain about something
- Consider what type of accidents might occur related to your work and know how to handle those problems
- Wear protective equipment appropriate for the work being done - at least a lab coat and safety goggles
- Open toed shoes (sandals) are not appropriate
- Avoid loose clothing and tie back long hair
- Wear gloves when weighing/handling chemicals
- Food and beverages (includes water bottles) are to be kept out of labs

- Use fume hoods for work using toxins and flammable liquids, as well as anything which creates unpleasant odours
- If chemicals are transferred from their original container, be sure the new container is compatible with the chemicals stored in it, and labeled appropriately (see section 14.4)
- When done, return equipment to its proper location
- Report any breakages or repair issues to your supervisor

## **7. Animal Biosciences Safety Committee Members:**

- Elijah Kiarie (Co-Chair; Employer Representative)
- Alexis De Leon (Co-Chair; Worker Representative)
- Heather Bailey (Worker Representative)
- Emily Hill (Graduate Representative)
- Haley Leung (Graduate Representative)

If you have safety concerns, take your questions first to your supervisor. If you still have concerns, then take your concerns to the Safety Committee for discussion.

## **8. Resources:**

- [Departmental Staff](#)
- Safety Board - located outside the lounge (room 230), 2nd floor
- Safety Board – located outside Main Office (room 144) of ABSc, 1st floor
- [Environmental Health and Safety Video Library](#)
- [University of Guelph - Safety Policy Manual](#)
- [EHS Chemical Inventory System](#)
- [Material Safety Data Sheets \(MSDS\)](#)
- [Merck Index](#)
- [Occupational Health and Safety Act and Regulations](#)
- Safety Manuals/Books and Standard Operating Procedures (SOP)

**NOTE:**

Labs should have up to date printed MSDS sheets (no more than 3 years old) for the 20 most hazardous materials located in these labs. The remainder must be accessible by computer.

**9. Useful Telephone Numbers:**

Emergency (medical, accident, fire)	Ext. 2000 or 52000
Campus Police (non-emergency)	Ext. 52245
Fire Division (non-emergency)	Ext. 52071
Environmental Health & Safety Office	Ext. 53282
Maintenance Services	Ext. 53854
Safe Walk Program	Ext. 53200

**10. Access to Solvent Vault, Liquid Nitrogen and Gas Cylinder Storage**

Keys are available to sign out from the Main Office:

- Solvent vault (room 109) – ABSc occupies the left cage (i.e. the left door inside of 109)
- Liquid Nitrogen from the 230L Dewar (walk in cooler room 180) – record weight of LN2 taken
- Gas Cylinders (room 176) – record tanks returned and taken in the book outside room 253.

## **11. Chemical Inventory System**

A chemical inventory is mandatory for labs. The Fire Dept. requires access to information on the potential hazards in labs they may have to enter.

To open the program, go to <https://cms.cs.uoguelph.ca> to access the login page. For difficulties or questions regarding the Inventory Program, please contact Environmental Health & Safety ext 53282

## **12. Emergency Procedures:**

In YOUR work area, do YOU know the location of the nearest:

- Exit
- Emergency Phone
- First Aid Kit
- Spill Kit
- Deluge shower and/or eye wash station
- Fire extinguisher

If a STRANGER entered your work area would they be able to immediately find:

- Spill kit
- First aid kit
- Fire extinguisher

Note: If you are not qualified to handle an emergency or if it is clearly beyond your control:

- evacuate the area immediately
- alert others to the problem and call for assistance
- attend to medical problems first (property and material can wait)

## 12.1 Medical:

### 1. First Aid/Responders

- kits located in or near most labs (replace bandages, etc. used)
- list of qualified first aid responders posted on Safety Board, in or near each kit, and throughout Dept.
- RENDER FIRST AID only if permission is granted and keep the casualty comfortable
- make sure their personal belongings are secure

### 2. Deluge Showers/Eyewash Stations in Animal Biosciences

#### Basement:

Room 024 – eyewash

Room 026 – eyewash

Room 047 – eyewash

#### First floor

Room 104 - shower and eyewash

Room 105 - shower and eyewash (are a unit)

Room 107 – eyewash

Room 111 - eyewash

Room 133 - shower and eyewash

#### Animal wing

Room 185 – eyewash

Room 174 (hall) - shower and eyewash (are a unit)

Room 061 (hall) - shower and eyewash (are a unit)

#### Second floor

Room 206 – eyewash

Room 208 – eyewash  
Room 209 – eyewash  
Room 212 – eyewash  
Room 213 – eyewash  
Room 215 – eyewash  
Room 218 – eyewash  
Room 220 – eyewash  
Room 259 – eyewash  
Room 261 – shower  
Room 262 – eyewash  
Room 263 – eyewash

### **3. Serious Injury and Obtaining Help**

Fire/police/ambulance dial ext. 2000 or 52000 - the dispatcher will arrange for an ambulance if necessary (Do not call 911 directly, as the responders from the city may not be able to locate you without assistance from campus security personnel.)

### **4. Injury and Incident Reports (personal injuries, property damage, near misses)**

All injuries should be reported to your supervisor and an injury/incident report filled out and faxed to EHS within 24 hours (incident report forms available online at [EHS](#) under “forms”).

### **5. Medical Conditions (Allergies and Diabetes)**

Medical conditions are a private matter. If you are comfortable, for your own safety, notify someone in your working environment of any medical information that might be needed in an emergency. This could include the wearing of contact lenses; however, it is not appropriate to wear contacts in a chemical environment.

## 12.2 Fire:

### 1. Evacuations Alarms:

When the fire alarm sounds (an intermittent pulse sound), close doors and immediately leave the building by the nearest exit. Do not use the elevator. If possible, shut down experiments and turn off associated services (i.e. water, heat). For extended evacuations, be sure to notify the responders if equipment has been left on!

Classes should exit the building in an orderly manner and congregate together until further instructions are given by the Faculty/Teaching Assistant.

### 2. Fire in a Laboratory:

Attempt to extinguish fire only if equipment is readily available, it can be done safely, and provided a safe escape route exists BEHIND you

NOTE: fat extraction room 263 - if fire - leave room immediately - CO2 will be dispersed into room automatically when fire detected, creating an oxygen deficient atmosphere

NOTE: solvent vault room 109 is also equipped with a CO2 fire suppression system. Read the rules posted beside door to ABSc cage before entering.

Fire extinguishers should be located near the main exit to each lab.

**(PASS = pull, aim, squeeze, sweep)**

**PULL** AND TURN the locking pin to break the seal

**AIM** LOW at the base of the flames

**SQUEEZE** the handle

## **SWEEP** from side to side

- Never use more than one extinguisher - evacuate the area
- Close door(s) and pull the nearest wall-mounted fire alarm (at entrance to stair wells usually)
- Leave the building - phone 2000 or 52000, report location of fire
- Report to the emergency responders when they arrive
- Know your designated escape route and at least one alternate route
- Make sure emergency routes (including alternate routes) are not blocked

### **12.3 Hazardous Materials Incidents:**

#### **1. Spill Kits:**

Spill Kits located in each lab, usually near the lab exit, include a list of the contents of the kit, and what to use for various spills. The Spill Kits must be **readily visible** and **accessible** (not on a high shelf, behind boxes or gas cylinders).

#### **2. Simple Spills and Complex Spills:**

**Simple spills** (4 L or less) - use the chemical spill kit in the lab to clean up the spill

**Complex spills** - those spills considered too large or too hazardous for persons to clean up without special equipment.

Note: The following represents examples of chemicals often found in Animal Biosciences but does not cover every possibility.

- For clean-up assistance of spills, as needed - phone the Fire Division ext. 52071 during regular hours Mon-Fri - outside regular hours, phone ext.2000 or 52000.

#### **Mercury and Mercury Containing Compounds**

- Use non-mercury thermometers where ever possible.

- The Fire Division ext. 52071, Monday to Friday (holidays excluded), has a special mercury vacuum cleaner if your problem can not be easily cleaned up.
- Tape off the area and advise others around the situation.
- There is a kit available for cleaning up very small spills (i.e. thermometers) in Central Core Materials used are charged back to the faculty.

### **Noxious Odours**

E.g. mercaptoethanol may cause nausea/vomiting or may mimic odour of a gas leak. Inform authorities quickly, so they are aware the odours are not caused by a gas leak.

### **Ammonia Spills**

Concentrated ammonia (ammonium hydroxide solution releases caustic vapours which require use of respiratory protection).

### **Hydrochloric Acid Spills**

Concentrated hydrochloric acid releases very corrosive vapours which require use of respiratory protection. Spills larger than 1 L may require assistance.

### **Flammable Solvent Spills**

It is important to keep flammable vapours away from any ignition source (e.g. the motor on a fridge or freezer). Use the vapour suppressant spill control material (use carefully as it is dusty) in the spill kit and place the used materials in a functional fume hood until disposal can be arranged.

## **3. Fumes of Undetermined Origin**

Notify the Main Office (ext. 56215) and they will arrange to have it investigated.

#### **4. Gas Leaks**

Natural gas has been disconnected in this building except for the Meat Wing abattoir.

#### **5. Floods or Loss of Power**

Maintenance ext. 53854 (After hours, ext. 52245, Police dispatch)

### **13. Chemical Hazards in the Laboratory**

#### **13.1 Overview of Workplace Hazardous Materials Information System (WHMIS):**

The three major elements of WHMIS are:

- material safety data sheets (MSDS)
- labels
- training

Attendance at an EHS WHMIS seminar is a mandatory condition of employment and for graduate students at the University of Guelph (valid for 3 years). WHMIS courses are also available on line through EHS.

#### **13.2 Flammable and Combustible Materials:**

##### **Fire Prevention/Control Measures**

##### **Definitions:**

- Flammable materials can burn at room temperature
- Combustible materials must be heated before they will burn
- Commonly referred to as the "fire triangle" - a fire can only be sustained if heat, fuel and oxygen are present
- Flashpoint refers to the minimum temperature at which a liquid gives off sufficient vapour to ignite a source if ignition is present

- Vapours from most flammable liquids are heavier than air - ignition of this vapour (e.g. The motor on a fridge/freezer) can flash back to the liquid via the vapour trail

**Prevention/Control:**

- Minimize the amount of flammable liquids kept in a lab
- Work in a well-ventilated area (fume hood)
- Use approved flammable liquid storage cabinets
- Don't store flammable liquids in domestic refrigerators (they are not non-sparking)
- Use bonding clamps (alligator clips) to ground large metal containers containing flammable liquids in storage (room 109)
- When dispensing from these large storage containers, also bond the containers to each other with alligator clamps - this helps avoid static charge build-up
- Remember that waste flammable liquid must also be handled carefully - it is still flammable (keeping in mind the flash point may have changed if the original liquid has been combined with other chemicals during the procedure)

**13.3 Oxidizing Materials**

- Provide a source of oxygen or other oxidizing elements such as chlorine
- These materials can cause fires if in contact with flammable and combustible materials, even in the absence of oxygen or a source of ignition
- Sulphuric, perchloric and nitric acids should be kept to a minimum because they are strong oxidizers
- Contaminated and old bottles of perchloric can develop explosive characteristics
- Buy bottles in sizes that can be used up relatively quickly

- Organic peroxides are especially dangerous because they can provide both the fuel and the oxygen in the fire triangle
- Be sure oxidizers are compatible with other oxidizers in the same storage area
- To avoid the release of dusts, solutions of oxidizers are better than the dry forms
- Diluting with water reduces the reactivity of solutions

### **13.4 Corrosive Materials**

- Most common are acids (pH 1-6) and bases (caustics, alkalis) (pH 8-14)
- The farther a pH is from 7 (neutral) the more corrosive the chemical is
- Often liberate heat when combined with water
- Hydrochloric acid and nitric acid will corrode anything metal, (may release hydrogen gas), even when the cap appears to be on tightly
- Always add corrosives to water, never the opposite, when diluting (easiest way to remember - if solution splashes - do you want water splashing you or the corrosive material - assuming the material being poured into more likely to splash, than what is being poured)
- Safety carriers available (room 254) for LOAN to transport corrosive liquids
- Separate acids from bases (potentially are not compatible together)
- Note that some corrosives are also combustible, e.g. acetic acid

### **13.5 Dangerously Reactive Materials**

- Covers a variety of chemicals which in general react to jarring, compression, heat or light or may burn, explode or release dangerous gases when mixed with other materials
- Most importantly - these chemicals may not be reactive at the time of purchase, but may become reactive over time – e.g. diethyl ether and picric acid (dry)
- Keep small quantities in a lab and dispose of unused chemicals promptly (within 6 months if open, and 1 year if sealed - unless otherwise specified by manufacturer)

### **13.6 Insidious Chemical Hazards**

- Mercury spills - a highly toxic material (discussed in 12.3 (2))

### **13.7 Dust, Fumes and Aerosols**

- Seek technical assistance if you are unsure of the proper safety precautions
- Dust - use the appropriate dust masks for nuisance non-toxic dust
- Fumes and aerosols - use of fume hood or biological safety cabinet as required by your specific application

## **14. Chemical Storage**

- Be sure lids are securely on containers - but remember no lid is ever totally "air tight" so separate chemicals appropriately.

### **14.1 Dry Chemicals**

- Store dry chemicals BEHIND doors (glass or metal), back from the edge, not on open shelves (the spray from high pressure fire hoses/extinguishers may knock chemicals off shelves, causing more of a hazard if chemicals mix)

### **14.2 Solvent Chemicals**

- No more than 5 L of flammable (total 10 L flammable/combustible) solvents may be stored in a lab, unless the lab is equipped with a yellow solvent cabinet.
- In a yellow solvent cabinet, no more than 300 L of flammable/combustible solvent can be stored (of the 300 L, only 50 L flammable solvent allowed)
- Note - if there are common lab doors between labs which are normally kept open then the 5 L limit is for the entire open area

### **14.3 Acids and Bases (Liquids)**

- Can be stored in the cabinets under the existing fume hoods
- Acids must be stored separately from bases

- The cabinets must be clearly labeled acid or base
- Keep mineral acids (sulfuric, nitric, hydrochloric, perchloric) away from solvents and other combustibles (e.g. organic acids).
- Organic acids (e.g. acetic) can be stored with solvents if some separation is maintained (however since separation is often the issue, we do not recommend storing them together)
- Ammonia is a caustic base and should be kept away from acids (“heat of reaction” if they mix)

#### **14.4 Transfer of Chemical from Original Bottle**

- The new container must have a label indicating:
  - o name of chemical, company, catalogue number
  - o concentration of chemical
  - o who is using chemical
  - o date of transfer
  - o safe handling/storage procedures
  - o whether a Material Safety Data Sheet (MSDS) is available

### **15. Hazardous Waste Disposal:**

#### **15.1 Disposal/Replacement of Sharps Containers (to EHS)**

- Disposal - sharps (needles, syringes, scalpel blades etc.) must be disposed of in the designated sharps containers (come in different colours, generally red or yellow)
- How to dispose of full containers:
  - o Autoclave the container on its side on a tray (use autoclave tape and leave lid open)
  - o After autoclaving, seal & tag container - tags available in small file drawer cabinet in Room 259
  - o Fill out appropriate form – the chemical waste & sharps forms are available on the EHS website – then mail or fax to Environmental Health & Safety (EHS)

- Put it in a designated place and container will be picked up by EHS for disposal (usually Fridays)
- Replacement containers can be ordered through companies such as Fisher Scientific

## **15.2 Waste/Surplus Chemical Disposal**

- How - Disposal forms available on EHS web site, tags available in small file drawer cabinet in room 259 or from EHS.
  - Identify the chemical to be disposed of
  - Fill in the form/tag the chemical
  - Mail or fax completed form to EHS
  - If several chemicals, place in a box (one tag for the entire box) and put in a prominent location for pick up (usually on Fridays)
- Reagents Containing Multiple Chemicals
  - List the chemicals, highest concentration first
  - List the approximate percentage of each chemical
  - Don't forget water if part of the reagent
- Waste
  - List what is in waste container - be specific
  - EHS will not pick up waste that is not identified by a list of its chemical components
  - Contact EHS for assistance if you are unsure how to proceed
- Note: Don't leave your old reagents for "the next person". No matter how carefully made a reagent is - over time evaporation occurs, chemicals become less stable. Dispose of chemicals properly and promptly. Expiry dates are often on the chemical

bottles, otherwise the company will be able to tell you when to dispose of specific chemicals.

### **15.3 Biohazard Contaminated Material Disposal**

Confirm autoclave times and temperatures for sterilization (sheets beside the autoclave). All cell culture and microbial material, surgical, biological waste etc. must be autoclaved in the orange bio-hazard bags prior to disposal. Do not dispose of this material into the bypass waste unless it has been autoclaved. Be sure to place these bags on a tray prior to autoclaving and clean the tray afterwards!

If your lab protocol requires monitoring of the autoclave “load” to test for sterility and a satisfactory “kill” of organisms refer to the binder near the autoclave in room 105 – set aside for this purpose. Directions are posted in the binder. Individual labs are responsible to purchase their own bio-monitoring vials.

### **15.4 Dead Stock Disposal**

Speak to Heather Bailey ([hbailey@uoguelph.ca](mailto:hbailey@uoguelph.ca)) or Doug Wey ([dwey@uoguelph.ca](mailto:dwey@uoguelph.ca)).

## **16. Physical Hazards in the Laboratory**

### **16.1 Compressed Gases: (SOP and training available)**

Inert gases can be stored indoors, flammable gases (i.e. Hydrogen, methane, acetylene are stored in the shed on the SW loading dock)

#### **Personal Protective Equipment required:**

Lab coat, safety glasses, steel toed shoes may be appropriate

#### **Hazards:**

- Cylinders are heavy and unstable

- Some gases are noxious and have explosive characteristics if heated or damaged (e.g. if regulator or valve knocked off = a torpedo type of explosion)

### **Ordering**

The Technical Staff orders gas cylinders in ABSc. Sign the log book outside room 253 (mandatory) regarding tanks taken or returned to the storage areas in room 176. There is a monthly charge for tanks, and inventories must be kept.

### **Use of:**

- Cylinders must be secured to a solid object, 2/3 up from the floor, with appropriate straps or chains at all times.
- For transportation of compressed gases, a hand truck is available for LOAN from the tank room (Animal Wing, 176)
- Do not transport tanks with regulators still attached always secure the safety cap before moving a tank
- Properly tag or mark any tanks being returned to the storage cage as “empty” or “in use”
- Be sure the regulator and connectors being used are those specified by the manufacturer for the specific gas and pressure desired
- Open valves slowly and stand to the side of the gauges
- A soap solution can be used to check for leaks (bubbles) at the connections
- All returned tanks MUST have a cap on them.

### **16.2 Cryogenics (SOP and training available)**

- Most common example is liquid nitrogen (LN2).

- **Personal Protective Equipment required**

Lab coat, long pants, proper footwear (no open toed or sandals), safety glasses, full face protection, & insulated gloves (glasses, face shield and gloves are available next to the tank)

- **Hazards**

- Burns and other tissue damage - protect skin from frostbite
- Containers cooled in liquid nitrogen will, as their temperature rises, experience an increase in internal pressure (explosive capabilities) - reason for face protection
- Avoid wearing jewelry (may become brittle if in contact with LN<sub>2</sub>)
- Use only Dewar flasks manufactured for use with cryogenic gases - never use domestic
- "Thermos" bottles as they may explode, or open pans!

- **About the 230 L Dispensing Tank in Animal Biosciences (walk in cooler room 180)**

- Dewar has 3 valves on the top of the tank. Where the valves connect with the center of the tank there is a small silver tag (may be covered in ice) labeled either vent (green), gas (grey) or liquid (blue valve handle) – don't depend on the colour – read the label.
- Ensure nozzle attached to liquid valve

**Procedure for obtaining liquid nitrogen from the 230L Dewar in ABSc**

- Users/owners of Liquid Nitrogen Dewars are responsible for filling their own tanks as required. Only dispense Liquid Nitrogen with the cooler door open, to avoid creating an oxygen deficient atmosphere inside the cooler (a confined space).
- Read the Standard Operating Procedure (SOP) posted beside the 230 L tank
- Weigh your tank before and after filling.
- Record the information on the log sheet (clipboard next to the scale)

- Note - there is a charge for liquid nitrogen, so you must do this
- If you are filling a new tank, note this on the log - there is an extra charge for filling a warm tank, as additional LN2 is required to cool and fill the tank
- Users are responsible to change empty tanks (training session covers this).

#### **Procedure for obtaining liquid nitrogen from BOC/LINDE**

- Due to the large number of tanks in ABSc, LINDE/BOC prefers you obtain LN2 from the 230L tank. All deliveries are made on Thursday at a random time but usually around 12-1pm. If you must have your tank filled directly by LINDE/BOC, then the following applies:
  - Tank must be labelled with faculty name, department (i.e. ABSc), volume of tank and 26-digit charge code - tanks will not be filled if this information is unclear or missing. Thursdays, LINDE/BOC will fill tanks (by prior arrangement) - be sure your tank is on the loading dock (Animal Wing end of building) first thing in the morning
  - Phone LINDE/BOC (519-822-6490) to receive a fill on days other than Thursdays

#### **16.3 Electrical Hazards**

- a potential ignition source - spark from a motor starting up (e.g. on a fridge) could start a fire if spilled solvent (or resulting gases/fumes – e.g. toluene) encountered each other
- high voltages used in Electrophoresis applications

#### **16.4 Ionizing/Non-Ionizing Radiation**

- Ionizing - these include x-rays, gamma rays, alpha particles, beta particles and neutrons - see section on radioactivity (Appendix D) for more information

- Non-ionizing - these include lasers (beware of any accessible laser sources), microwaves and ultraviolet radiation (UV light requires special UV rated safety glasses)

### **16.5 Heat/Cold**

- Wear the appropriate protective clothing when working in areas of extreme temperature

### **16.6 Noise**

- Wear ear protection (e.g. plugs, muffs) when working in a noisy environment (e.g. homogenizers, plant grinding room)

## **17. Hazard Controls**

### **17.1 Use/Store Less of Hazardous Materials**

- i.e. Chloroform
- Even when stored properly and stabilized, generates phosgene which is potentially fatal (exposure to 20 ppm for 1-2 minutes can cause severe lung injury and 570 ppm for 1 minute can cause death)
- Chloroform comes in three basic varieties: - no stabilizer, stabilized with amylene or stabilized with an alcohol such as ethanol
- Treat chloroform as a time-sensitive chemical (6-month maximum) and if possible buy it stabilized with alcohol, since alcohol is usually added in higher concentrations than amylene, providing better protection from phosgene generation

### **17.2 Engineering Controls**

- I.e. Fume hoods
- ABO fume hoods are equipped with Ventalert alarms to alert the user to low flow rates, below 100 fpm, BUT they only work if you have them turned ON

- If the alarm is activated, stop working in that hood immediately and call Maintenance (ext. 53854) to arrange repairs.
- During an electrical shutdown (i.e. the fume hoods stop functioning) the Ventalerts MUST be turned OFF at the unit on the fume hood. The unit contains a 9Volt battery which will run down and must be replaced otherwise.
- A flow meter is available to test flow rates – contact the ABSc JHSC

### 17.3 Personal Protective Equipment (PPE)

- Always check that the PPE chosen is appropriate for the hazard!
  - **Eye/face:** safety glasses, goggles
  - **Respiratory:** nuisance non-toxic dust masks (note they are often NOT designed for over beards)
  - **Hands:** always wash your hands after removing gloves - see most company catalogues for more information on gloves or contact the sales rep
  - **Feet:** steel toed work boots or rubbers - boot allowance available for regular full time faculty and staff, if you work in an area requiring foot protection
  - **Head:** hard hat (most commonly used in Meat Wing)
  - **Body:** knee-length lab coats, coveralls, aprons - as required
- Note - Latex Allergies (from gloves usually) - reactions include:
  - Contact dermatitis (a non-allergic reaction, skin rash resulting from repeated irritation produced by sweating under the gloves),
  - Allergic contact dermatitis (a rash covering glove area, delayed hypersensitivity which is activated on subsequent exposures)
  - Immediate allergic reactions (IgE mediated, may be mild, moderate or severe)
  - Be aware of the risks associated with sensitization to latex
  - Avoid unnecessary use of latex gloves and substitute with synthetic or hypo-allergenic, non- powdered gloves if possible

- Creams/lotions should not be used under gloves since they may react with the latex

#### **17.4 Labelling of Unattended Experiments**

- If it is necessary to leave experiment unattended or overnight, leave a sign "Caution, Experiment in Progress" with special instructions (i.e. radioactive material, as well as a contact person to notify in an emergency). Unexpected events happen, often at night, which may require maintenance or other emergency responders to enter a workplace.
- Note: hazardous operations, e.g. heating flammable solvents, are not to be left unattended

### **18. Other Orientation Topics**

#### **18.1 Laboratory Equipment**

- Autoclave (Appendix A)
- Biological Safety Cabinets (Appendix B)

Centrifuge (Appendix C)

#### **18.2 Field Work**

- If your work takes you to any of the Research Stations, be sure to speak with the Manager of the appropriate station (prior to commencing your work), to find out what safety information/training you may require.

#### **18.3 Working with Animals: (More Hazards!)**

- Working with animals exposes workers to zoonosis (diseases transmissible from animals to humans, i.e. rabies, avian flu) and sensitization (the development of allergies)

- Generally, the more similar the species is to man, the greater the risk of acquiring a severe zoonosis and the more dissimilar the species is to man, the more likely the development of allergies
- Other hazards (besides zoonosis) of working with animals include:
  - o trauma from animals (unpredictable at times)
  - o injury from use of animal handling restraint equipment
  - o needle sticks
  - o water/drowning/scuba hazards working in aquatic areas
- **Animal Care Workshops** (through Animal Care Services) are located at [Animal User Training](#). The 4 core online modules are mandatory. The Methodology courses usually cover a wide range of topics and generally include “hands on” training. Note most Methodology courses are offered in the late spring. Check the web site for the current dates and availability since not all animal courses are offered at the same time.
- **Rabies Titre**  
Occupational Health Services will provide inoculations against rabies for individuals working with animals. There is a fee for students.
- **Teaching and Research Animal Records**  
An approved Animal Utilization Protocol (AUP) is required in advance of starting any work with animals. The Office of Research, Animal Care Services requires that records **MUST** be kept on individual animals - from arrival in the department to departure, including dates, where located, researcher, procedures done, illnesses, and drugs administered. These records must be kept on file for a minimum of 2 years after the animal has left the facility.

#### **18.4 Surgery: (SOPs and Training available)**

- The ABSc surgical suite is located on the first floor of the Animal Wing. Speak to Heather Bailey ([hbailey@uoguelph.ca](mailto:hbailey@uoguelph.ca)) if you need to use this facility.

### **19.Special Laboratory Rules**

#### **19.1 Working Alone/Safe Walk Program:**

- Hazardous operations (e.g. fat extraction, grinding, use of meat saws) are strictly prohibited after hours (4:30 p.m.) or on weekends and holidays
- It is never a good idea to work alone - be sure someone knows where you are and for how long
- If doing hazardous operations (during regular hours), use the buddy system, so that you are always within someone's sight
- In the evening, use the safe walk program, it is available during the fall and winter semesters (ext. 53200)

#### **19.2 Door Locks:**

- ABSc has moved to an access card system (available to students at the beginning of the semester for a nominal fee) or a department key. Computerized access will be programmed for the doors to be open during the day and for scheduled events.
- Never prop doors open!

#### **19.3 Access to Specific Areas/Rooms:**

- Room 174 is a plant grinding and feed mixing facility, hours 9:00 a.m. - 4:30 p.m., Monday - Friday (holidays excluded)
- Other areas of the building may have similar restrictions - be sure to ask prior to setting up your experiment, especially if you are in an area generally used by many labs

#### **19.4 Garbage:**

- Refer to the University of Guelph's website, [www.pr.uoguelph.ca/sustain](http://www.pr.uoguelph.ca/sustain) for information regarding their policies on recycling, hazardous materials and laboratory waste.

#### **20.Required Certification Courses**

- WHMIS (offered by EHS)
- Radiation Seminar (offered by EHS)
- Plant Grinder training for potential users (offered by ABSc) < Feed mixer training for potential users (offered by ABSc)
- Radiation seminar by ABSc for potential users (offered by ABSc) < Safety & orientation seminar (offered by ABSc)
- Other courses may be required for individual work environments

#### **21.Other Training Opportunities**

##### **21.1 Environmental Health and Safety (EHS)**

- The EHS website address is [www.uoguelph.ca/ehs](http://www.uoguelph.ca/ehs). Courses can be signed up for, on line.

##### **21.2 Human Resources**

- Refer to the "Faculty and Staff Development Opportunities" available online at [www.uoguelph.ca/learningmatters](http://www.uoguelph.ca/learningmatters) during the fall and winter semesters for a variety of seminars - students are welcome – some courses charge a fee

##### **21.3 Workplace Specific Training**

- Records must be kept for all individuals, indicating training received. Note that this document does not replace “workplace specific training”:
  - o in individual labs
  - o on specific pieces of equipment

- how to use equipment safely
- how to handle an accident
- where emergency equipment is
- in specific techniques (i.e. gel electrophoresis, radioisotopes, biohazards, use of autoclaves)

## Appendix A: (SOP and Training Available)

### Autoclaves (Basic Information Only):

- Sterilization in this Dept. is done using steam
- pressure (20 psi), temperature (121 °C), and time (varies with application) are all controlled to optimize sterilization
- Seek assistance if a first-time user

#### 1. Location of autoclave (room 105, floor model) and log books:

- Directions (SOP) are posted on wall beside autoclave. Sign the log book with the time you start your load.
- 4 cycles available – cycles 1 to 3 are pre-set
  - o cycle 1 – Liquid - Sterilize Time 25 min
  - o cycle 2 – Gravity - Sterilize Time 30 min, Dry Time 20 min
  - o cycle 3 – Gravity - (garbage) Sterilize Time 2 hr, Dry Time 20 min
  - o cycle 4 - this cycle can be changed – follow directions below
- Important for cycle 4: change only the type of cycle (liquid or gravity and the time; nothing else)
- Autoclave waste during the evening due to the odour.

#### 2. Hazards & Injuries

- Stand to the side, back from the autoclave door, never over it, and open the door slowly and partially, after an autoclave cycle - as soon as the door is opened the steam escapes and rises
- Use thermal lined mitts when handling autoclaved materials – return mitts to autoclave!
- Be careful with liquids - allow liquid loads to cool before moving - superheated fluids can have explosive capabilities (similar situations can occur in a microwave).

### 3. Operation

- Secure door - door is double hinged (apply pressure evenly to both sides of door wheel when closing chamber door clockwise) - door “pins” lock up inside the outer part of the chamber door
- press cycle number **“once”** - will give information on that cycle
- press cycle number **“twice”** within 5 sec - will start cycle
- **Check that steam is not escaping around the door** - it makes quite a loud noise so it should be obvious if there is a problem. **Always wait until LED screen says sterilize before leaving autoclave. “reset” will abort cycle**
- **at end of cycle** - open door slowly about 2.5 cm, to allow steam to escape - autoclave begins 10-minute countdown for liquid loads (cycle 1) – **must wait 10 minutes** - even if door will open - need to get liquids below the boiling point of 100C by 5C - to prevent liquids exploding.
- IMPORTANT - let printer finish printing message - then hit reset (if too early hitting “reset” printer will just keep trying to print warning message)
- **“auto utility” energy conservation – assumes 5-day work week, shutdown approx. 5 pm, restart 8:30 a.m. – this is a normal function (if “auto utility on” – load, press any cycle to activate the unit, autoclave automatically shuts down again when done)**
- Placing power switch to “standby” - shuts off all steam and water (i.e. for a scheduled steam shutdown)

### 4. Preparation of Loads

- Except for sharps containers and bio-hazard contaminated material (i.e. garbage), only clean materials should be autoclaved.
- Biohazard contaminated material must be autoclaved in the orange bio-hazard bags (on a shallow metal tray to catch leakage).
- Wrap items in muslin (heavy cotton) or other approved wrap (aluminum foil not recommended, especially if tightly wrapped - steam doesn't easily penetrate).

- Loose items should be placed in a shallow metal tray.
- Avoid stacking of items, or crowding.
- Liquids should not be more than 50 to 75% of the capacity of the flask - always place containers on a shallow metal tray to minimize spills.

#### **Autoclaving Garbage:**

- Please autoclave garbage at end of day - after 4:30 p.m.
- Use cycle 3 (gravity - sterilize time 120 minutes (2 hours))
- Since our temperature is 121°C, longer exposure times required for a complete kill.
- If possible - combine garbage loads with other users (do not stack bags).
- Always put a shallow drip tray under the garbage bag.
- Do not seal the bags - steam must be able to get into and out of the bag.
- Remove completed loads promptly
- Seal bags for disposal.
- Autoclaved garbage smells badly - please consider the people who work in this lab.
- **Autoclaving Sharps containers** – the autoclave in room 105 is a gravity displacement unit – therefore the lid should be open and the container on its side – put the lid on after sterilization is complete.

#### **Autoclave Loading Hints:**

- Center load in autoclave (front to back and side to side) - Away from walls
- This is a steam sterilizer - Sealed containers will not be sterilized
- Steam must be able to get into and out of each item in load
- Use shallow trays - higher sides on the trays mean longer exposure times required to get steam into load.
- Note - for loads that contain both dry & liquid materials, use the liquid cycle.

- **Liquids:**
  - o **Do not cap** containers **tightly** or use self venting flasks - pressure build up may cause glass may break and liquid also will not sterilize properly.
  - o Vessel should be twice as large as volume to be autoclaved.
  - o **Do not move** hot liquids - bumping may cause bottles to break explosively.
- Choose appropriate cycle/sterilize time for your load - keep in mind a longer exposure time is better than too short - refer to the binder for more information.

## Appendix B:

### Biological Safety Cabinets: (Basic Information Only)

- Record use of cabinet in log book
- Turn off UV lamp if unit has one and turn on fluorescent lamp
- Check air grilles for obstructions, switch on blower
- Allow air to purge workspace 5 minutes
- Clean all interior surfaces with appropriate disinfectant and allow to air dry
- Assemble only material required to do the procedure in the hood (caution using Kimwipes, they tend to get sucked up into the fan, resulting in costly repairs) place clean and contaminated materials so they do not meet
- Allow air to purge workspace for another 5 minutes
- Wear protective clothing as appropriate
- Introduce hands into work space, working methodically from clean to work areas to the discard area
- Keep hands in the work space until procedures are complete
- After completion, allow air to purge workspace for another 5 minutes
- Remove all contaminated protective clothing (i.e. gloves) as appropriate
- With fresh gloves, clean the work space and disinfect as before
- Turn off blower and fluorescent lamp (turn on UV lamp if unit has one)
  - o **Note** - it is not necessary to leave UV lamp on when unit not in use - there are limitations and there is much discussion over how useful a UV lamp is
- Clean up work area

## Appendix C:

### Centrifuges: (Basic Information Only)

- To use a centrifuge unfamiliar to you, ask for assistance in learning how to use it - improperly used, centrifuges can be very dangerous.
- Balance centrifuges properly (ask if you are uncertain how to do this) - everything, including the tube caps must be balanced.
- Use tubes intended for use in centrifuges, with proper caps to prevent spills. Also, be sure the tubes chosen are rated for the speed you will be centrifuging.
- Plastic tubes are preferred over glass. Glass are more inclined to break
- Centrifuges **should not** be left unattended, since a tube may crack and the rotor become unbalanced at any time.
- **Before** starting the centrifuge, know how to stop it quickly should a problem arise. This usually means shutting the “run” switch off. Be careful about turning off the main power as the braking system may stop the rotor a lot faster than the air friction in the drum. Safety features are sometimes disabled when the main power is turned off, so turn off power as a last resort. < For ultracentrifuges, and other centrifuges where appropriate, record in a log book the use for each rotor (the rotors become down-rated for speed over time and so this must be documented)
- Most of the newer centrifuges won't allow the lid to be opened until the rotor has completely stopped. Older models may not have this safety feature - so NEVER EVER open a centrifuge that is still spinning!
- Clean up any spills (with a non-abrasive brush) and dry centrifuge IMMEDIATELY after use, to avoid corrosion and damage. Scratches will reduce the life of the rotor. Rotors should be stored upside down.

### Types of Centrifuges:

- **microfuges** (accommodate 1.5 mL Eppendorf tubes) maximum speed about 10,000 rpm
- **bench top centrifuges** - maximum speeds vary - consult manuals

- **low speed centrifuges** (floor model) - maximum speed about 5,000 rpm
- **high speed (or super speed) centrifuges** - maximum speed about 25,000 rpm
- **ultracentrifuge** - maximum speed about 100,000 rpm

### Calculation of Speed:

- To calculate the rotational speed (rpm) or relative centrifugal force (RCF or g force) for a centrifuge, consult the manual or the company web site for the centrifuge for more details. In general:
  - o the RCF can be calculated from the centrifugal radius (r) in cm and the rotational speed (n) in revolutions per minute (rpm).
    - $RCF = 1.118 \times 10^{-5} \times r \times n^2$
  - o the RPM, the rotational speed is determined as:
    - rpm = square root of  $[RCF / (1.118 \times 10^{-5} \times r \text{ (cm)})]$

## Appendix D: (SOPs and Training through EHS and ABSc available)

### Radioactivity: (Basic Information Only)

#### Project Applications

- Permit Holder Forms are available from Environmental Health & Safety online.

#### Safe Handling of Radioisotopes

- All associated personnel, including faculty, are required by Environmental Health and Safety (EHS) to attend a 6-hr training session (2 half days) with the Radiation Safety Officer, prior to commencing work with radioisotopes for the first time at the U of G.
- Sign up for sessions online at EHS web site
- Seek technical assistance regarding use of isotopes in ABSc

#### Radioisotope Laboratories

##### Intermediate Level Radioisotope Lab (ILL) - room 211 (and hall access room 209)

- All procedures to be done in the ILL lab should be discussed prior to an experiment with the Lab coordinator - this specifically includes iodinations – Submit detailed procedures in writing for review and discussion.
- Access to the ILL is restricted - see Lab coordinator to sign out keys.
- A **mandatory** log sheet records use of room 211 (required by CNSC, the regulatory agency).
- Geiger meters are available for use - these may be borrowed for use in BLL labs
- **However**- do not remove from 211 without first advising the lab coordinator.
- All users are required to do individual wipe tests of their work areas when using the lab.
- Waste disposal is regulated - READ the appropriate signs & fill in the waste log sheets.

### **Radioisotope Counter Lab**

- Room 258 (Central Core area) is the radioisotope counter lab and has Beta and Gamma counters available for use by trained individuals

### **Basic Level Radioisotope Labs (BLL)**

- Individual "faculty" labs can be licensed as "basic level radioisotope labs" for radiation permit holders working with radioisotopes
- Each permit holder is provided with a binder containing the various forms and guidelines required to successfully manage their BLL.

### **ILL and BLL**

- Basic and Intermediate labs, to meet licensing requirements, MUST be locked when there is no one in the room
- Absolutely no food or drink (including water bottles) allowed in labs

### **Ordering must be done through the department financial clerk – NOT BY THE USER**

- a specific P.O. is required (<http://animalbiosciences.uoguelph.ca/forms>)
- be sure to include on the purchase requisition:
  - o the researcher's radioisotope project number
  - o the specific isotope being used (i.e. 125I)
  - o total number of uCi

### **Open Source Radioactive Materials Inventory**

- Note - the appropriate forms are part of the package for the project license (refer to the permit holder white binder)
- Each container of isotope is required to have complete documentation:
  - o initial purchase order (P.O.)
  - o packing slip
  - o shipping information off the box

- receipt of material (FAX to EHS, keep copy for records)
- detailed inventory of material and use
- method of disposal (disposal form and copy of disposal tag)
- these records must be readily available for CNSC spot inspections

### **Radioisotope Spills**

- Mark off the area around the spill to prevent further contamination
- Advise other personnel in the lab of the situation
- For significant spills, there is a “radiation spill kit” in room 209 on the counter
- Clean up spill as outlined in your radiation safety training with EHS.
  - In general - **Clean from outside inward, cleanest to dirty area - Continue cleaning and monitoring the spill area (by wipe testing) until counts return to background values**
- These wipe tests must be recorded in the “user” wipe test binder in room 209
- Collect the spill “waste” to be disposed of appropriately as per that specific radioisotope
- Radioisotope spills (significant situations or personal contamination) are to be reported to the Radiation Safety Officer
- Notify the Lab coordinator for assistance/direction in cleaning up an accident

### **Disposal of Radioisotopes**

- For more specific questions or a larger quantity, speak with the Radiation Safety Officer (EHS ext. 54888) or the Lab coordinator for 211.
- **How – in general**
  - There is a specific form, (refer to the permit holder white binder or online at EHS)
  - Tags are 3 parts, available in 211. When waste is picked up, 1 copy of tag is left for researcher to attach to their waste form files.

- Radioactive waste is disposed of from the room where the waste was generated
- **In Basic Level Labs**
  - Liquid waste - use the “gel” jars available in room 211 to solidify waste
  - Solid waste - use the plastic “tube” bags inside the specifically designed cardboard box - available from EHS - call ext.52047 to arrange
- **In Intermediate Level Lab (room 211)**
  - **Waste disposal is strictly regulated!**
  - **Liquid waste** - use the “gel” jars to solidify waste - label jar with isotope and if 125I or 32P, place behind lead shield in right hand fume hood
  - **Solid waste – radioactive:**
    - 3 grey bins - all INDIVIDUALLY labeled - have plastic “tube” bags inside specifically designed cardboard liners
      - 3H - tritium (lead lined)
      - 14C - carbon 14 (lead lined)
      - 32P - phosphorus 32 (not lead lined) < 125I - iodine – steel drums - The distinction in cans is “iodinated” versus diagnostic kit” iodine waste
    - ALL materials disposed of in these steel cans MUST be in puncture resistant sealed plastic bags (EHS plans to recycle these through the various ILL labs)
  - **Solid waste - non-radioactive:**
    - Normal yellow bagged garbage pail
  - **Liquid Scintillation (LS) vials:**
    - Collect vials in flats in the right-hand fume hood

- These must be labelled with your name, isotope, number of vials and total activity in the vials. Normally these would be stored in your BLL but some labs don't have a fume hood available. Discuss with the Lab co-ordinator before leaving your LS vials in room 211.
  
- **Wipe/Swipe Test Records (SOP and Training available)**
- **(Note - Users are responsible for doing all wipe tests in BLL and ILL facilities.)**
  - Monitoring (i.e. Geiger meter for appropriate radioisotopes) must be done daily while radioisotopes are used
  - Wipe/swipe tests are to be completed after each experiment or a minimum of once a week in areas using radioisotopes
  - If no radioisotope work is done during a week, indicate this in the wipe test records
  - Records of these tests, including a diagram of the area, where wipes taken and the results must be readily available for CNSC spot inspections.
  - Consult the Wipe Test SOP if you are unsure how to conduct a wipe test

## **Appendix E: Posted in prominent locations (Safety Board, labs, and offices)**

**The Department of Animal Biosciences Safety Committee urges to observe the following guidelines.**

**Take reasonable steps (i.e. due diligence) to be safe.**

**IF YOU ARE UNSURE, ASK – YOUR SUPERVISOR OR AN ABS<sub>c</sub> LOCAL JHSC MEMBER.**

- Persons UNDER 18 should ONLY be taken into laboratories or animal holding units with permission of the area supervisor and be under strict supervision. Personal PETS are not allowed in the ANNU building (bldg. 70) or the barn (bldg. 37).
- Laboratory DOORS should be LOCKED when the last person leaves the room, at any time.
- Observe caution if present in the building out of normal working hours. If you are WORKING ALONE, work behind locked doors. Try to ensure that someone else knows where you are. Do not attempt to perform potentially dangerous techniques while alone.
- If you have occasion for concern about leaving any of the buildings at night, contact SECURITY for an escort.
- For liability reasons, UNAUTHORIZED PERSONS should not assist you in your work.
- Examples of unauthorized persons are family members or friends who are not bona fide employees of the University of Guelph and who have not signed the Liability Waiver form.
- Check with your insurance company prior to using your personal vehicle for work. Be aware that your personal VEHICLE INSURANCE may not cover a third party if the purpose of your journey can be construed in any way as being work-related.
- DOORS to labs and offices should not be propped open. Closed doors are required to maintain the balance of air quality in each room and to contain fires or bad smells.

Open doors are a violation of the fire code. For SECURITY reasons, do not prop open exterior doors.

- Do not cover the DOOR WINDOWS - a requirement of the Fire Division.
- Calling for HELP from the Fire Department in good faith is expected. However, if the Fire Department is called repeatedly over a period for the same incident (such as a bad chemical odour) when nothing has been done to attempt to correct the problem, after the third call the Department will be charged for the cost of responding to the call.
- EXTENSION CORDS and POWER BARS for lab equipment are not allowed per the Fire Code. Normally, power bars are only suitable for use with computers (check the wattage specifications on each power bar). Tuck computer cables neatly away, allowing access to housekeeping for floor cleaning.
- FLAMMABLE LIQUID cabinets MUST be used for the storage of solvents. Fridges and Freezers must not be used to store flammable materials, unless specifically designed for that purpose. For information on Flammable Solvents in Labs, Quantity Limits and Safety Requirements consult the University of Guelph - Safety Manual policy 851.08.06 (on line).
- Some CHEMICALS fall under more than one category for proper storage (i.e. acetic is an organic acid, corrosive and combustible, nitric is a mineral acid, corrosive and an oxidizer).
- **All chemicals are to be stored behind glass or metal doors.**

#### **Acids and Bases (sample list only - not all inclusive)**

- **mineral acids (sulphuric, nitric, hydrochloric, perchloric)** must not be stored with solvents or **other combustibles (i.e. organic acids)** - **organic acids (i.e. acetic acid)** can be stored with solvents IF separation is maintained, however best if stored separately - **ammonia** is a caustic base and should be away from acids.

### **Oxidizing Chemicals (sample list only - not all inclusive)**

- **i.e. sulphuric, perchloric and nitric acids are strong oxidizers** - keep minimum amounts and be sure oxidizers are compatible with other oxidizers in same storage area - contaminated and old bottles of **perchloric acid** can develop **explosive** characteristics over time

### **Flammable (usually solvents) & other Combustible Chemicals**

- **At ground level or above** - no more than 5L of FLAMMABLE (total of 10L flammable/combustible) may be stored in a lab, unless the lab is equipped with a yellow solvent cabinet. In a cabinet, no more than 300L of flammable/combustible solvent can be stored (of the 300L, only 50L flammable solvent is allowed).
- **If doors between adjoining labs are normally kept open, the 5L limit applies to the entire open area.**
- **Below ground level, basements** - flammable liquids shall not be used in basements and no more than 5L of combustible liquids may be used in basements. No more than 5L of flammable and/or combustible liquids may be stored in basements.
- During a **FIRE ALARM**, do not re-enter the building until instructed to do so by the Fire Division or their designate OR until the alarms have stopped for at least 2 minutes!
- Confirm that you are using correct **AUTOCLAVE** times and temperatures (sheets beside the autoclave in room 105). All cell culture and bacterial material, etc., must be autoclaved in the orange bio-hazard bags prior to disposal. This material may then be disposed of in the waste dumpsters outside the building.
- **LATEX ALLERGIES & EXPOSURE TO OTHERS!** Do not wear disposable gloves (latex, nitrile, etc.) in hallways. One glove is permitted if care is taken to avoid touching door handles etc. with the gloved hand. Sensitive materials to be transported from room to room can be put into a box, to avoid glove use in halls.

- There should be no **FOOD OR BEVERAGES** (or water bottles) consumed or stored in labs. - There shall be no use of **RADIOISOTOPES** by personnel without prior training by EHS.
- **SAFETY BUCKETS** are available for safe transport of 4L bottles. (See technical staff).
- Keep **LABORATORIES** clean and tidy. **WORKPLACE INSPECTIONS** are done regularly.

**For emergencies or suspicious situations, ext. 52000 (or 2000) or use the emergency phones**

**Thank you for your co-operation in making our work environment safe.**

## **Appendix F:**

### **Due Diligence:**

#### **TAKE EVERY PRECAUTION REASONABLE IN THE CIRCUMSTANCES**

##### **Take**

- action
- to initiate internal responsibility
- responsibilities are personal and can't be contracted out or delegated to avoid liability

##### **Every**

- everyone is responsible
- risk is reduced when people understand that personal action is necessary
- more than just regulatory compliance
- employer, supervisor and worker responsibilities are integrated

##### **Precaution**

- determine the controls needed to provide safe working conditions, whether physical, behavioural, administrative or organizational

##### **Reasonable**

- common sense
- average person's behaviour on a good day
- to protect against accidents and to provide a defense if accident occurs and charges are laid

##### **In the Circumstances**

- look at the context of the situation

If a supervisor is charged under the OSHA can the supervisor's defense be due diligence? The burden of proof that every precaution reasonable in the circumstances was taken falls with the defendant. No punishment can further deter the defendant if they have already done everything reasonable in the circumstances. Aside from the legal technicality, the bottom line for OSHA prosecution is to reduce the risk of accidents in the work environment. The goal is to initiate the "Internal Responsibility System" (IRS), which simply means everyone is responsible, because anyone can cause/prevent accidents. If someone sees a problem over which they do not have authority, then they are to report it to a level that does have authority.

Due diligence is a set of actions, documentation, context (every situation will have its own requirements to meet due diligence) and is the responsibility of everyone (i.e. not the Safety Committee's responsibility to do your due diligence for you). The fundamental causes of accidents must be considered, not just the direct cause of an accident.

It is important to motivate people. They must see that everyone has a common interest in avoiding injury and illness. Unmotivated people aren't interested in learning safety techniques. Under the OSHA, you are your brother or sister's keeper.

The OSHA clearly sets out the duties of employers (sections 25, 26), supervisors (section 27) and workers (section 28) to ensure a safe working environment by reporting defects, contraventions and hazards. Within the internal responsibility system, if an individual is unable to correct the problem due to lack of knowledge, experience, authority or resources, then the problem must be reported to the next level of supervision until ultimately the problem is corrected. Lack of funds is not a legitimate reason for not correcting safety problems.

Why do you care about safety? Financial fines of \$500,000 are possible - duties under the law cannot be delegated to others - even if you can't necessarily be sued, you can be charged. Under the Worker's Compensation Act, in almost all cases an injured worker cannot sue fellow employees or their employer. However, individuals not covered by Worker's Compensation

(i.e. self employed private parties, volunteers, students in a course) could sue. Note that being sued is different to being charged by the Ministry of Labour or under the Criminal Code. The legal aspects of who can/cannot be sued or charged (i.e. prosecuted) require legal expertise to sort out. Sources of liability include criminal liability, private lawsuits (worker sues supervisor), regulatory liability (OHSA charges) and economic liability (additional penalties for poor accident records).

#### **Definitions as viewed by OHSA:**

- **Due Diligence** - take every precaution reasonable in the circumstances to avoid harm or offence (in an occupational or environmental sense)
- **Supervisor** - a person who has charge of a workplace or authority over a worker - authority does not mean a managerial position necessarily - it is the ability to direct someone's work (a zone or degree of control, "your space" - even if no one reports to you) - not just people with the ability to discipline or hire/fire. (In the context of Animal and Poultry Science, faculty are the most obvious supervisors, but not necessarily the only ones.)
- **Competent Supervisor** - a person who knows the job, the hazards and the health and safety law
- **Worker** - a person who performs work or supplies services for monetary compensation (note: grad students on a scholarship are not considered workers - if they are paid to do a specific work activity then they are workers, such as Teaching Assistants)
- **Authority** - the power an individual must get others to do things
- **Responsibility** - the obligation an individual must do - may have the responsibility but not the authority to carry out those responsibilities
- **Accountability** - evaluation for whether responsibilities were fulfilled and if authority was exercised properly