SCHOOL OF PLANT BIOLOGY

SAFETY MANUAL

THE UNIVERSITY OF WESTERN AUSTRALIA
Achieving International Excellence

To be read in conjunction with University Safety Policies
http://www.safety.uwa.edu.au/policies
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Context

Work safety and health laws aim to promote and secure the safety and health of persons at work through the elimination, reduction and control of hazards.

Safety and health in Western Australian workplaces is regulated by the Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations 1996 supported by codes of practice and guidance notes.

A summary of Western Australian work safety and health laws is available in Making the Workplace Safe.

The Act aims to

- promote and secure workers’ safety and health
- protect workers from hazards
- ensure safe hygienic working conditions
- reduce, eliminate and control hazards
- encourage cooperation and consultation between employers and employees, and their associations
- promote education and awareness of occupational safety and health
- provide for formulation of policies

The WorkSafe Western Australia web site
see also the UWA Safety & Health Office web site
http://www.safety.uwa.edu.au
General Policy Statement on Safety and Health Management

The University of Western Australia Occupational Safety and Health (OSH) Policy

This School fully endorses the UWA OSH policy. This handbook supplements the main UWA policy to provide and maintain safe and healthy working conditions, equipment and systems of work for all its staff, students contractors and visitors. To this end, information, instruction, training and supervision is provided as necessary.

The allocation of safety-related duties, the particular arrangements made to implement this policy and the way in which the policy is to be monitored is set out in this manual.

A copy of this statement will be made available to all staff and students via the School's website.

The policy will be kept up to date to take account of changes in the School's activities. To ensure this, the policy and the way in which it has operated will be reviewed when necessary and confirmed by the Head of School. Following review, a copy of the policy will be sent to UWA Safety & Health.

Signed Head of School

Name

Date

The full UWA OHS policy can be found at:
(http://www.safety.uwa.edu.au/policies/occupational_safety_and_health)
School of Plant Biology Safety Policy

The School of Plant Biology seeks to encourage all students, staff and visitors to make full use of all facilities maintained by the School. However, there are a number of simple precautions that all persons are asked to observe. Staff, students, visitors and contractors must recognise their joint responsibilities and cooperate to ensure the highest possible safety and health standards are maintained in all University activities (from the University policy).

1. Supervisors must complete the UWA Safety Induction Checklist with new employees during the first week or as soon as practicable after the employee commences. Safety inductions should also be conducted with honours and postgraduate students, and with visitors to the School who are accommodated in offices, laboratories, workshops or other workplaces of the University. Safety Induction Checklist is available in this document or access webpage at: http://www.safety.uwa.edu.au/policies/induction

2. All instruments (from the most expensive and complicated e.g. mass spectrometers - to the most simple, e.g. electronic balances) are the responsibility of one or more members of staff. You should not use any equipment until you have asked for and received the induction and permission to do so. In some instances, you will be required to attend special training courses (e.g. 4WD driving course, boat handling course) before you are allowed to use that facility.

3. It is School policy that persons must not work alone in the field or after hours in the labs.

4. Some facilities are infrequently staffed (e.g. histology laboratory). It is your responsibility to ensure that someone else knows where you are working at all times. This applies if you are working in a glasshouse, a laboratory or other parts of the School (e.g. storerooms, grinding rooms etc) or indeed in other parts of the university (e.g. Soil Science laboratories, EM centre, other Schools). All personnel must complete the after hours register when working during evenings (i.e., after 6PM) or weekends.

5. Some facilities available for the use of Plant Biology personnel are not maintained by Plant Biology, (e.g. Combined Workshop, Shenton Park Field Station) and appropriate permission must be sought and appropriate training obtained before use.

6. Some instruments, equipment and activities have inherent dangers (use of centrifuges; use of chainsaws; SCUBA diving; use of radio-isotopes; tree-climbing; use of toxic, carcinogenic, caustic, flammable, explosive chemicals, etc.). It is your responsibility along with your supervisor to acquaint yourself with those dangers and to seek the appropriate help and/or training and advise from your supervisors. In many instances these activities/instruments/pieces of equipment will have detailed instructions and/or guidance available. Again, it is your responsibility in conjunction with your supervisor to make sure you obtain that help/guidance.

7. All Plant Biology personnel, students and visitors are expected to observe, scrupulously, any rules and regulations that might be applied by governments,
companies or other agencies with whom they work. Being part of a University does not confer special privileges in this respect.

8. All Plant Biology personnel must attend the Plant Biology Safety Induction which occurs twice per year.

9. All Plant Biology personnel are expected to wear appropriate clothing, including footwear, according to the School safety notes.

10. All Plant Biology personnel are expected to make themselves familiar with the UWA guidelines for reporting accidents and incidents and with the relevant regulations and offices within the University (e.g. OH&S, Risk Management, Property and Buildings, etc) as set out in the Safety Induction.

11. All Plant Biology personnel should keep with them at all times, in a wallet or purse or similar, a record of key telephone numbers; cards containing these numbers will be given out during inductions or can be obtained from the School Safety Officer.
Emergency Procedures

Priorities

Protection of Life
Before any steps are taken to prevent the spread of the hazard, to secure assets, or to eliminate the hazard, ensure that all people who may be in danger are warned, and that action is taken to guarantee their safety.

Prevent Spread of Hazard
Try to control the extent of the hazard within the building and minimise its release into the environment.

Save Assets in the Affected Area
Prevent personal and University assets from being damaged.

Eliminate the Hazard
Eliminate the fire by extinguishment.

Building Warden (fire, bomb threat, etc.)
List of Building wardens can be found at:
http://www.safety.uwa.edu.au/people/wardens/agriculture_central
http://www.safety.uwa.edu.au/people/wardens/botany_and_herbarium

If the alarms have not sounded, please send someone to notify the building warden IMMEDIATELY. Then follow their instructions or the procedures outlined in the emergency procedure section of this manual.

Remember... we can replace equipment, but we cannot replace you. If you have any doubt about your ability to put out a fire, do not attempt to fight it.

Emergency Evacuation
The UWA policy can be found at
http://www.safety.uwa.edu.au/policies/..../policies/emergency_fire_and_evacuation

On hearing the alarm or discovering a fire:

- Help people in immediate danger
- Warn others by shouting "Fire Fire Fire", raise the alarm if not already sounding and telephone 2222
- Don't use a fire extinguisher if you have not been instructed on how to use one
- Turn off electrical equipment if possible
- Collect personal valuables
- Move to closest exit, closing windows and doors behind you
- Move to the muster point: Taxonomic Garden (Botany), Thurling green or Science Library courtyard (Plant Biology and WAHRI)
- Report to your Fire Warden that you/your group is there and if you know of anyone trapped in the building
- Remain in the muster area until you are informed that you may leave; do not re-enter the building
- If a Fire Warden requires assistance, please help
- If you have activated the Fire Alarm you MUST meet with the building Warden at the main fire control panel to provide them with as many details as possible.

**If you are trapped in a room:**
- exit through a window if you are on the ground floor
- if you are not on the ground floor:
  - close the door
  - go to the window
  - if there is smoke in the room open the window a little so you can breathe fresh air; if not, do not open the window (this can assist in the spread of fire into your area from lower floors)
  - attract people’s attention to your plight e.g. by writing on a paper and sticking it to the window or calling out the window (if you open the window remember to close it again; do not open the window up fully)
  - if the room is filling with smoke, stay close to the ground
  - wait for the fire brigade to rescue you

**If you have to move through a closed door that you cannot see through:**
- feel the door to see if it is hot
- look for smoke coming under the door
- open the door slowly and look around it to see if there is a fire behind it
- if there is no fire on the other side, proceed through and close the door behind you

Wardens can be identified by the red warden caps/hats

**Building Warden Duties**

In emergency:

1. determine the nature of the emergency and decide on the appropriate action
2. if an emergency is declared, initiate the emergency procedures:
   - contact Security on 2222
   - ensure that the Wardens are advised of the situation
   - initiate evacuation of the building/workplace
   - brief emergency service personnel on their arrival and thereafter act on the instructions of the emergency service’s senior officer
Ongoing:

- be available, or organise Warden cover, throughout all normal working hours
- organise and distribute to all Wardens and to all building occupants relevant information for use in an emergency e.g. for Wardens, information on assisting mobility impaired people, people panicking
- prominently display evacuation procedures and plans for all areas
- maintain and distribute to all building occupants a current list of all Wardens and their Deputies (with phone numbers and locations)
- organise the training of wardens
- organise fire drills with the Safety & Health Office (at least one per year)

**Academic Staff giving lectures/lab classes**
These areas require explicit organisation because of the potential for large numbers of people to be congregated in a small area. The person in charge of the class shall act as the Warden and is responsible for evacuating his/her area by directing students to:

- remain calm and push chairs, large bags, etc. under desks or benches
- turn off electrical devices and laboratory operations that are not safe to be left unattended
- in controlled sequence, move along gangways to main aisles and exit
- move to the muster point

**First Aid Officer**
At the muster point the First Aid Officer will perform first aid as per training.

**Other Specialists**
Depending on the area, a specialist may be required in the case of special hazards that may arise in the event of a fire in the area e.g. a chemist who can assist with the assessment on the effects of certain chemicals in a fire environment.

**Laboratory Emergency Response Procedures**
http://www.safety.uwa.edu.au/policies/../policies/laboratory_emergency_response

<table>
<thead>
<tr>
<th>Emergency and precautions</th>
<th>Minor</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical</strong></td>
<td>Initiate first aid</td>
<td>Remain calm</td>
</tr>
<tr>
<td></td>
<td>Report incident</td>
<td>Initiate lifesaving measures if required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Do not move person unless there is danger of further harm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keep person warm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Call for emergency response</td>
</tr>
<tr>
<td><strong>Fire</strong></td>
<td>Alert people in laboratory and activate alarm.</td>
<td>Alert people in area to evacuate.</td>
</tr>
<tr>
<td>Small fires can be extinguished</td>
<td></td>
<td>Activate nearest fire alarm or</td>
</tr>
</tbody>
</table>
without evacuation. Fire extinguishers should only be used by trained personnel. Never enter a room that is smoke filled. Never enter a room containing a fire without a backup person. Never enter a room if the top half of the door is warm to touch

**Smother fire or use correct fire extinguisher.**
- Aim extinguisher at base of fire.
- Always maintain accessible exit.
- Avoid smoke or fumes

**call Security number.**
- Close doors to confine fire.
- Evacuate to safe area or exit building through stairwell; do not use lift.
- Have person knowledgeable of incident and laboratory assist emergency personnel

### Chemical spill
The range and quantity of hazardous substances used in laboratories require preplanning to respond safely to chemical spills. The cleanup of a chemical spill should only be done by knowledgeable and experienced personnel. Spill kits with instructions, absorbents, reactants, and protective equipment should be available to clean up minor spills. A minor chemical spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. All other chemical spills are considered major

**Alert people in immediate area of spill.**
- Wear protective equipment, including safety goggles, gloves, and long-sleeve lab coat.
- Avoid breathing vapors from spill.
- Confine spill to small area.
- Use appropriate kit to neutralize and absorb inorganic acids and bases. Collect residue, place in container, and dispose as chemical waste.
- For other chemicals, use appropriate kit or absorb spill with vermiculite, dry sand, or diatomaceous earth. Collect residue, place in container and dispose as chemical waste.

**Attend to injured or contaminated persons and remove them from exposure.**
- Alert people in the laboratory to evacuate.
- If spilled material is flammable, turn off ignition and heat sources.
- Call for assistance.
- Close doors to affected area.
- Have person knowledgeable of incident and laboratory assist emergency personnel.

### Biological spill
Biological spills outside biological safety cabinets will generate aerosols that can be dispersed in the air throughout the laboratory. These spills are very serious if they involve microorganisms that require Group 3 containment, since most of these agents have the potential for transmitting disease by infectious aerosols. To reduce the risk of inhalation exposure in such an incident, occupants should hold their breath and leave the laboratory immediately. The laboratory should not be reentered to decontaminate and cleanup the spill for at least 30 minutes. During this time the aerosol will be removed from the laboratory by the exhaust air ventilation system. Appropriate protective equipment is particularly important in decontaminating

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

**Attend to injured or contaminated persons and remove them from exposure.**
- Alert people in immediate area of spill.
- Close doors to affected area.
- Put on protective equipment.
- Cover spill with paper towels or other absorbent materials.
- Carefully pour a freshly prepared 1 in 10 dilution of household bleach around the edges of the spill and then into the spill. Avoid splashing.
- Allow a 20-minute contact period.
- Use paper towels to wipe up the spill, working from the edges into the center.
- Clean spill area with fresh towels soaked in disinfectant.
- Place towels in a plastic bag
Spills involving microorganisms. This equipment includes lab coat with long sleeves, back-fastening gown, disposable gloves, disposable shoe covers, and safety goggles and mask or full face shield. Use of this equipment will prevent contact with contaminated surfaces and protect eyes and mucous membranes from exposure to splattered materials.

| **Radioactive spill** | Alert people in immediate area of spill. Notify DRSO. Wear protective equipment, including safety goggles, disposable gloves, shoe covers, and long-sleeve lab coat. Place absorbent paper towels over liquid spill. Place towels dampened with water over spills of solid materials. Using forceps, place towels in plastic bag. Dispose in radioactive waste box. Monitor area, hands, and shoes for contamination with an appropriate survey meter or method. Repeat cleanup until contamination is no longer detected. | Attend to injured or contaminated persons and remove them from exposure. Alert people in the laboratory to evacuate. Have potentially contaminated personnel stay in one area until they have been monitored and shown to be free of contamination. Call SRSO. Close doors and prevent entrance into affected area. Have person knowledgeable of incident and laboratory assist emergency personnel. |

<table>
<thead>
<tr>
<th><strong>Contact with person</strong></th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Clothing on fire</strong></td>
<td>Roll person around on floor to smother flame, or drench with water if safety shower is immediately available. Obtain medical attention, if necessary. Report incident to supervisor.</td>
</tr>
<tr>
<td><strong>Radioactive spill on body</strong></td>
<td>Remove contaminated clothing. Rinse exposed area thoroughly with water. Obtain medical attention, if necessary. Report incident to supervisor and School Radiation Safety Officer.</td>
</tr>
<tr>
<td><strong>Chemical spill on body</strong></td>
<td>Flood exposed area with running water from faucet or safety shower for at least 5 minutes. Remove contaminated clothing at once. Make sure chemical has not accumulated in shoes. Obtain medical attention, if necessary. Report incident to supervisor.</td>
</tr>
<tr>
<td><strong>Biological spill on body</strong></td>
<td>Remove contaminated clothing.</td>
</tr>
</tbody>
</table>
| Hazardous material splashed in eye | Vigorously wash exposed area with soap and water for 1 minute.  
|                                | Obtain medical attention, if necessary.  
|                                | Report incident to supervisor.  
| Hazardous material splashed in eye | Immediately rinse eyeball and inner surface of eyelid with water continuously for 15 minutes.  
|                                | Forcibly hold eye open to ensure effective wash behind eyelids.  
|                                | Obtain medical attention.  
|                                | Report incident to supervisor.  
| Minor cuts and puncture wounds | Vigorously wash injury with soap and water for several minutes.  
|                                | Obtain medical attention.  
|                                | Report incident to supervisor.  
|
First Aid

All accidents need to be reported to your supervisor in the immediate instance as well as the Safety and Health Representative within 24 hours, no matter how insignificant, and an injury/incident report form completed (http://www.safety.uwa.edu.au/forms/incident). Forms are to be sent to the Safety & Health Office within 24 hours of the incident (or as soon as practicable).

If it is an emergency and you are unable to locate the Safety and Health Rep. contact the First Aid officers or the School Manager.

First Aid Kit locations:
Room 1.103 – Colmer Lab
Room 1.110 – Micro Lab
Room 1.120 – General Office
Room 1.130 – Molecular Lab
Outside Room 2.100 in the passage
Room 2.107 – Lambers Lab
Room 2.122 – Tissue Culture Lab
Room 2.137 – Bio Lab
School of Plant Biology Safety Committee

Please see the website for an up-to-date list of committee members
http://www.plants.uwa.edu.au/710547

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greg Cawthray</td>
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<tr>
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<td>6488 7934</td>
</tr>
<tr>
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<td><a href="mailto:r-creasy@cyllene.uwa.edu.au">r-creasy@cyllene.uwa.edu.au</a></td>
<td>6488 8549</td>
</tr>
<tr>
<td>Rowena Long</td>
<td>Kings Park Rep</td>
<td><a href="mailto:Rowena.Long@bgpa.wa.gov.au">Rowena.Long@bgpa.wa.gov.au</a></td>
<td>9480 3622</td>
</tr>
</tbody>
</table>

Role of committee
- Management & review of OSH management plans, safety objectives & targets
• Management & review of Hazard Identification & Risk Registers
• To develop a universal safety culture in the School in conjunction with the UWA Safety and Health Office.
• The committee will meet every three months.

Terms of Reference
• Review emergency response procedure
• Maintain and review Hazard Identification and Risk register
• Manage and review OSH management plans, objectives and targets
• investigate accidents, injuries and near misses in the School
• identify and rectify hazards in the School
• oversee routine frequent safety inspections of the School and review remedial actions identified
• issue improvement notices to personnel responsible for various areas
• provide safety advice to School personnel
• liaise with external agencies and other Schools on safety issues
• compile and update School safety manual incorporating procedures for the use of hazardous materials and equipment in the School
• formulate School policy on safety issues
• provide suitable workplace safety training regimes/courses
• Minutes available on the Plant Biology website:
  http://www.plants.uwa.edu.au/710547

If you have any questions or suggestions, please do not hesitate to approach any or all of the safety committee members. We are here to ensure a safe working environment for all people in the School and will be glad to hear any suggestions for improvement.

If you feel the issues are not being resolved, the diagram in Section 3 of this manual shows the issue resolution procedure in place at the University. It can also be found at www.safety.uwa.edu.au/policies/resolving_safety_&_health_issues
Who to Contact

IN THE CASE OF AN EMERGENCY PHONE EXTENSION 2222

Please have the following information ready:

1. The type of emergency
2. Your location (building and room number)
3. Your name and phone extension

Emergency Contacts

Security Office (24 hours emergencies incl. ambulance) 2222
Security Office (to report suspicious activity) 3020
Free call from campus public phones 1800 655 222
Hospital (QE II “G Block” Emergency) 0 9346 3380
Doctor (UWA Medical Centre) 2118 (office hours)
Poisons Information Centre 0 13 11 26 (24 hours)
Overseas emergencies www.safety.uwa.edu.au/policies/travel
(Please obtain an emergency contact card before you travel)

Switchboard 99
### Wardens

**Agriculture Central (Building 405)**

Please refer to the website for an up-to-date list
http://www.safety.uwa.edu.au/page/8646

Assembly areas:  West – CLIMA Entrance
East – Thurling Green

<table>
<thead>
<tr>
<th>Area</th>
<th>Role</th>
<th>Name</th>
<th>Tel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Warden</td>
<td>Alan Luks</td>
<td>2541</td>
<td></td>
</tr>
<tr>
<td>Deputy Building Warden</td>
<td>Kirsten Frost</td>
<td>2206</td>
<td></td>
</tr>
<tr>
<td>Ground Floor Faculty Office</td>
<td>Area Warden</td>
<td>Sophie Peoples</td>
<td>3821</td>
</tr>
<tr>
<td>Ground Floor Faculty Office</td>
<td>Deputy</td>
<td>Kate Bath</td>
<td>7467</td>
</tr>
<tr>
<td>Ground Floor CRC</td>
<td>Area Warden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Floor Computer Wing</td>
<td>Area Warden</td>
<td>Sean Grosse</td>
<td>1813</td>
</tr>
<tr>
<td>First Floor Walkway to Soil Science</td>
<td>Area Warden</td>
<td>Matthew Nelson</td>
<td>3671</td>
</tr>
<tr>
<td>First Floor Walkway to Animal Biology</td>
<td>Area Warden</td>
<td>Michael Renton</td>
<td>1959</td>
</tr>
<tr>
<td>First Floor East - clear rooms river end</td>
<td>Area Warden</td>
<td>Anouska Cousin</td>
<td>1989</td>
</tr>
<tr>
<td>First Floor West - clear rooms Broadway end</td>
<td>Area Warden</td>
<td>Barbara Jamieson</td>
<td>1782</td>
</tr>
<tr>
<td>First Floor CLIMA</td>
<td>Area Warden</td>
<td>Sue Dodimead</td>
<td>1973</td>
</tr>
<tr>
<td>Second Floor West - clear rooms Broadway end</td>
<td>Area Warden</td>
<td>Perry Swanborough</td>
<td>3700</td>
</tr>
<tr>
<td>Second Floor East - clear rooms river end</td>
<td>Area Warden</td>
<td>Pieter Poot</td>
<td>2491</td>
</tr>
<tr>
<td>Second Floor Walkway to Soil Science</td>
<td>Area Warden</td>
<td>Sheng Chen</td>
<td>3700</td>
</tr>
</tbody>
</table>

**Agriculture North (Building 401)**

Please refer to the website for an up-to-date list

Assembly area:  Outside Science Library

<table>
<thead>
<tr>
<th>Area</th>
<th>Role</th>
<th>Name</th>
<th>Tel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Warden</td>
<td>Deborah Swindells</td>
<td>2539</td>
<td></td>
</tr>
<tr>
<td>Deputy Building</td>
<td>Fay Davidson</td>
<td>5506</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>Role</td>
<td>Name</td>
<td>Tel.</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------------</td>
<td>--------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Ground Floor West - Library end - incl.</td>
<td>Area Warden</td>
<td>Mechelle Owen</td>
<td>1512</td>
</tr>
<tr>
<td>Legend Lecture theatre and computer lab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Floor East - River end</td>
<td>Area Warden</td>
<td>Fay Davidson</td>
<td>5506</td>
</tr>
<tr>
<td>First Floor West - Library end</td>
<td>Area Warden</td>
<td>Deborah Swindells</td>
<td>2539</td>
</tr>
<tr>
<td>First Floor East - River end</td>
<td>Area Warden</td>
<td>Margaret Blackberry</td>
<td>3771</td>
</tr>
</tbody>
</table>

**Botany (Building 409)**

Please refer to the website for an up-to-date list


**Assembly area:** Taxonomic Gardens

<table>
<thead>
<tr>
<th>Area</th>
<th>Role</th>
<th>Name</th>
<th>Tel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground - PB</td>
<td>Area Warden</td>
<td>Hai Ngo</td>
<td>3598</td>
</tr>
<tr>
<td>Ground - Biology</td>
<td>Deputy</td>
<td>Husnan</td>
<td>.</td>
</tr>
<tr>
<td>Ground - PB</td>
<td>Area Warden</td>
<td>Paul Greenwood</td>
<td>2520</td>
</tr>
<tr>
<td>Ground - WAMSI</td>
<td>Deputy</td>
<td>Linda McGowan</td>
<td>4573</td>
</tr>
<tr>
<td>Ground - Hobbs</td>
<td>Deputy</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>1st Floor - Botany</td>
<td>Area Warden</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>1st Floor - Biology</td>
<td>Deputy</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deputy</td>
<td>Sue Creagh</td>
<td>2275/2257</td>
</tr>
<tr>
<td>2nd Floor - Botany</td>
<td>Area Warden</td>
<td>Pauline Grierson</td>
<td>7926</td>
</tr>
<tr>
<td></td>
<td>Deputy</td>
<td>Mark Brundrett</td>
<td>2212</td>
</tr>
<tr>
<td>2nd Floor Biology</td>
<td>Deputy</td>
<td>Matthias Boer</td>
<td>7194</td>
</tr>
<tr>
<td></td>
<td>Deputy</td>
<td>TBA</td>
<td>.</td>
</tr>
</tbody>
</table>

**Botany Annexe 1, Annexe 2 (Building 410) and Plant Growth Facilities (Building 409)**

Please refer to the website for an up-to-date list


**Assembly area:** Taxonomic Gardens

<table>
<thead>
<tr>
<th>Area</th>
<th>Role</th>
<th>Name</th>
<th>Tel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annexe 1</td>
<td>Building Warden</td>
<td>Chloe Flaherty</td>
<td>7923</td>
</tr>
<tr>
<td>Building</td>
<td>Position</td>
<td>Name</td>
<td>Phone</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------</td>
<td>------------</td>
<td>-------</td>
</tr>
<tr>
<td>Annexe 2</td>
<td>Building Warden</td>
<td>All resident staff</td>
<td></td>
</tr>
<tr>
<td>Glasshouses</td>
<td>Building Warden</td>
<td>Steve Mole</td>
<td>2202</td>
</tr>
<tr>
<td>Glasshouses</td>
<td>Area Warden</td>
<td>Robert Creasy</td>
<td>8549</td>
</tr>
<tr>
<td>Glasshouses</td>
<td>Area Warden</td>
<td>Bill Piasini</td>
<td>4758</td>
</tr>
</tbody>
</table>
First Aid Officers

Please refer to the website for an up-to-date list


<table>
<thead>
<tr>
<th>Name</th>
<th>Area</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pandy du Preez</td>
<td>Central Wing</td>
<td>3863</td>
</tr>
<tr>
<td>Hai Ngo</td>
<td>Botany and Annexes</td>
<td>3598</td>
</tr>
<tr>
<td>Robert Creasy</td>
<td>Plant Growth Facilities</td>
<td>8549</td>
</tr>
<tr>
<td>Elizabeth Halladin</td>
<td>Student Labs</td>
<td>2573</td>
</tr>
</tbody>
</table>

School Safety Officer (SSO)

The School Safety Officer is Alan Luks, Ex: 2541.

The role of the School Safety Officer is to represent the Head of School on matters of safety in the workplace.

School Safety and Health Representative (SHR)

The School’s SHR is Greg Cawthray, Ex 1789, and any contact made can be done in total confidence.

The functions of a Safety and Health Representative (SHR) are, in the interests of safety and health at the workplace for which they are elected:

- Represent staff, students and visitors on safety and health issues in the workplace
- to inspect the workplace or any part of it at such times as agreed with the Faculty/School/Discipline/Centre heads
- immediately, in the event of an accident, a dangerous occurrence, or a risk of imminent and serious injury to, or imminent and serious harm to the health of any person to carry out any appropriate investigation in respect of the matter
- to keep informed on the safety and health information provided by the University in accordance with the Occupational Safety and Health Act
- forthwith to report to the immediate supervisor any hazard or potential hazard to which any person is, or might be, exposed at the workplace that comes to his/her notice
- to refer any matters that he/she thinks should be considered by the School Safety Committee or the University Safety Committee
- to consult, cooperate and liaise with staff or students regarding matters concerning the safety, health and welfare of persons in the workplace
Responsibility and Accountability

Introduction

The Occupational Safety and Health Policy, approved by the Vice-Chancellor, commits the University to ensuring a safe and healthy workplace for staff, students, contractors and visitors. This policy provides further information on the responsibilities and accountabilities for such.

To effectively implement this policy, staff at all levels are required to be made aware of their responsibilities and also held accountable for their actions or inactions. This requires the ongoing incorporation of occupational safety and health (OSH) principles into work practices, the ongoing commitment of resources to OSH and communications between all levels of staff and others.

All staff and students are responsible for their own safety and health and for that of others whose activities they may influence or control. The degree of responsibility a person has will depend on his or her level of influence or control. This concept is recognised in law. This responsibility may be delegated, but in no way is it absolved.

All Managers

The following responsibilities are established in law and are the general responsibility of all management staff. In addition to the general duties, specific responsibilities also apply.

It is management’s responsibility to ensure that those issues that they cannot directly control are passed onto the relevant person(s).

All managers shall, as far as it is practicable, provide and maintain a working environment in which staff, students and others are not exposed to hazards and shall

- provide and maintain workplaces, plant and systems of work such that as far as practicable, staff, students, contractors and others are not exposed to hazards
- provide such information, instruction, training and supervision of staff and students as is necessary to enable them to perform their work in such a manner that they are not exposed to hazards
- consult and co-operate with safety and health representatives, employees and others at the workplace regarding safety and health issues
- where it is not practicable to avoid the presence of hazards at the workplace, provide staff and students with such adequate personal protective clothing and equipment as is practicable to protect them against those hazards, without any cost to the staff and student (as appropriate)
- make arrangements for ensuring that, so far as practicable that the use cleaning, maintenance, transportation and disposal of plant; and the use, handling, processing, storage, transportation and disposal of substances at the workplace is carried out in a manner such that staff, students, contractors and others are not exposed to hazards

All managers should have a basic understanding of the provisions of the relevant OSH and workers’ compensation legislation, codes of practice, Australian and other
standards as well as of the UWA specific safety and health policies, procedures and guidelines. The UWA Occupational Safety and Health policy requires OSH to be an integral part of the responsibility of every manager and all those responsible for staff must be aware of, and take appropriate action on, OSH matters which may affect staff under their control.

**Deans, Heads of Schools, Directors of Centres / Sections**

In addition to the general responsibility placed on all managers, Deans, Heads of Schools, Directors of Centres / Sections are also responsible for the following within their work areas:

- Establishing local policy and management of safety and health
- Regularly evaluating and reviewing occupational safety and health performance indicators for the work area
- Appointing and supporting the necessary safety personnel
- Allocating the necessary resources to the safety and health program
- Devising and implementing priority plans to address concerns that cannot be resolved immediately
- Ensuring all staff are adequately trained and competent, with respect to safety and health, for the tasks undertaken
- Ensuring all staff, students (as applicable) and others (as applicable) undertake a thorough safety induction upon commencement of employment or duties
- Ensuring that supervisory staff are aware of and act upon their responsibilities
- Ensuring the proper supervision of staff, students and others
- Ensuring staff and students are aware of the reporting and resolution process for hazards, incidents and injuries
- Establishing local safety and health consultation and information arrangements
- Establishing and actively supporting a local Safety Committee
- Annually reviewing the safety and health record of the work area, including occupational safety and health management plans, and issuing a statement of safety objectives for the following year
- Noting all incident and injury reports, near miss reports, hazard reports, safety inspection reports and ensuring remedial action has been taken
- Keeping staff informed of safety matters, and ensure that procedures are in place to identify hazards, monitor and control risks and that systems are maintained and reviewed regularly
- Ensuring all necessary records are kept and maintained up to date
- Cooperating with the rehabilitation of injured and sick employees in accordance with the University’s injury management policy
• Ensuring compliance with legislations, University safety and health policies, procedures and guidelines

Safety Committees
Faculties/Schools/Centres and Sections are strongly encouraged to systematically address safety and health matters through effective Safety Committees involving representatives from senior management, staff (academic, general), safety and health representatives and students. Suggested agenda items for these Committees are

• hazards reported and actions arising
• incident/injuries and lost time follow ups
• workers' compensation support (as necessary)
• safety related training (including inductions)
• workplace inspections and follow ups
• implementation of University, Faculty and School safety related policies, procedures, and guidelines
• safety budgets and funding
• promotion of a workplace safety culture
• preparing for workplace audits and submitting for recognition of achievements (eg UWA Safety Awards)

Supervisors
Supervisors are those who have responsibility for the control of other persons within a work area or part of a work area of a Faculty/School/Centre/Section. In addition to the general responsibilities, supervisors are also responsible for

• ensuring that all staff supervised within their area are aware of their responsibility to work and act safely
• conducting regular safety inspections
• conducting and reporting incidents, injuries or near miss reports and/or investigations and ensuring corrective action is taken as necessary
• making training recommendations, as they see necessary, to the Faculty/School/Centre/Section heads
• ensuring the proper induction of new staff, following University guidelines
• cooperating in the rehabilitation of injured employees
• cooperating in the implementation and administration of the University safety and health policies, procedures and guidelines

University employees, undergraduate and post-graduate students
All employees and students are responsible for working and acting safely. Specific responsibilities include
• taking reasonable care of their safety and health and that of co-workers, students and visitors
• cooperating with the implementation and administration of University safety policies, procedures and guidelines
• observing all instructions and rules issued to protect their safety and health and that of others
• using plant and equipment as instructed by their supervisor
• making proper use of all safeguards, safety devices, personal protective equipment and other appliances for safety purposes
• using protective equipment and wearing personal protective clothing as instructed
• seeking information or advice regarding hazards and procedures where necessary before carrying out new or unfamiliar work
• being familiar with emergency and evacuation procedures and the location of first aid kits, personnel and emergency equipment, and if appropriately trained, using emergency equipment
• reporting all incidents, injuries, near misses and hazards to their supervisor

Safety and Health Representatives
The functions of a safety and health representative are, in the interests of safety and health at the workplace for which they are elected
• to inspect the workplace or any part of it at such times as agreed with the Faculty/Department/Centre/Section heads
• immediately, in the event of an accident, a dangerous occurrence, or a risk of imminent and serious injury to, or imminent and serious harm to the health of any person to carry out any appropriate investigation in respect of the matter
• to keep informed on the safety and health information provided by the University in accordance with the Occupational Safety and Health Act
• forthwith to report to the immediate supervisor any hazard or potential hazard to which any person is, or might be, exposed at the workplace that comes to his/her notice
• to refer any matters that he/she thinks should be considered by the local Safety Committee or the University Safety Committee
• to consult, cooperate and liaise with staff or students regarding matters concerning the safety, health and welfare of persons in the workplace

School Safety Officers
The role of School Safety Officers is to assist Heads of Schools and Directors of Centres /Sections and supervisors in fulfilling their safety and health related responsibilities. Specific responsibilities include
• Assisting with a management systems approach to safety and health within the School /Centre /Section
• Assisting with the appointment of safety personnel and ensuring they understand and fulfil their responsibilities

• Coordinating their activities with those of other safety personnel such as Safety and Health Representatives, First Aid Officers, Building Wardens, Wardens and designated School or Section Safety Officers (Biological, Chemical, Fieldwork, Radiation)

• Conducting or coordinating regular internal safety inspections

• Discussing potentially hazardous processes and operations with staff, students and visitors and obtaining their cooperation in reducing them as much as possible

• Informing Heads of Schools and Directors of Centres/Sections in writing of remaining hazards (responsibilities for carrying out risk assessments lies with the staff member in control of the operation)

• Familiarising themselves with any Statutory or University regulations, policies and procedures which would normally be applicable and informing their Head of School in writing in cases where this is not done

• Periodically inspecting hazard, incident and injury reports, investigating where appropriate, and taking appropriate action to achieve safe working and prevent recurrences

• Recommending to the Head of School any changes to avoid hazards (the responsibility for implementing such recommendation rests with the Head of School)

• Informing others of possible hazards by distribution and circulation of safety information and by appropriate publicity e.g. circulars, posters

Wardens
The evacuation of buildings may be required in the event of fires, major spills, bomb threats or earthquakes. Heads of School are primarily responsible for ensuring evacuation procedures are developed and enforced within their work areas. Wardens are responsible for assisting in the planning and the actual execution of building evacuations.

Wardens are required to be familiar with recognising and responding to alarms, ensuring the building is evacuated, ensuring that all personal can be accounted for and for liaising with the support services which are required to attend to the alarm. Each building should have a Building Warden and a number of Wardens for areas within the building. It is essential that there be deputy wardens to assist and in case of absences.

First Aid Officers
Nominated First Aid Officers have current Senior First Aid Certificates and have skills in basic first aid as well as more complex life saving techniques such as expired air resuscitation and cardio-pulmonary. First Aid Officers are required to be familiar with the specific hazards and conditions of their workplace.
Contractors

Contractors includes principal contractors and their sub contractors, who may be engaged by UWA Facilities Management, Faculties, Schools or Sections for construction, building and infra-structure maintenance and repair, communication installations and deliveries on campus.

Contractors are required to comply with the UWA Contractor Safety and Health policy and are responsible for:

- Ensuring their staff are properly qualified and trained to safely undertake the work
- Ensuring they and their staff are properly inducted to UWA specific standards
- Submitting a completed Risk Management Checklist with proof of insurances
- Submitting a Safety Management Plan for larger contract works
- Obtaining permits to work as required prior to commencing any hazardous work such as hot work, asbestos removal, demolition, confined spaces or electrical work.

Visitors

Visitors are responsible for cooperating with University safety and health requirements and not interfering with any aspects of the safety and health management systems on campus.
Campus Wide Common University Policies

To be read in conjunction with the other University Safety Policies [http://www.safety.uwa.edu.au/policies/occupational_safety_and_health](http://www.safety.uwa.edu.au/policies/occupational_safety_and_health)

**Smoking Policy**
The University of Western Australia is a smoke-free working environment.

All buildings and parts of buildings are designated non-smoking, as are all University vehicles.

This policy applies to circulation areas such as corridors, stairs, lavatories, auditoriums, service areas, lifts and foyers. This policy can be found at [www.safety.uwa.edu.au/policies/smoking](http://www.safety.uwa.edu.au/policies/smoking)

**Children in the workplace**
The University recognises that provision for staff and students with family responsibilities is a fundamental prerequisite for achieving equality of educational and employment opportunity. The Human Resources Policies and procedures manual details these provisions and associated responsibilities.


It is the responsibility of the staff or student to ensure that the family member or visitor stays within the safety guidelines, and does not wander in and out of laboratories where potential hazards may exist for an untrained person.

**Animals on campus**
No person shall bring on to nor allow to remain on the Lands any animal whatsoever unless such person is in possession of a Permit authorising such act or such person does such act as an approved part of a course of study or research. Refer bylaws: [http://www.publishing.uwa.edu.au/calendar/latest/partb/part5.asp](http://www.publishing.uwa.edu.au/calendar/latest/partb/part5.asp)
Security

Security Staff are provided by the University. After hours incidents of theft, suspicious persons, damage to property or premises should be reported to Security on 3020 or 2222. During working hours such matters should be reported to the School Manager or the Health and Safety Rep, so that an incident report form can be completed.

Security Staff will provide an escort to your vehicle when working on campus after hours, ie. at night or during the weekend. Telephone 3020 to request this service and please allow 20 minutes notice.

Some suggestions to keep you safe:

1. Walk in well lit areas at night, where possible
2. Always look around you and be aware of who is around
3. Get your car keys out of your bag before you leave the building, not while standing at your car
4. Phone for a security escort if you need to walk around at night on campus (call Ex 3020, please allow at least 20 minutes notice before you need them for this service)
5. Always make sure your valuables are locked away securely
6. Make sure your computer is locked to the desk
7. Lock your office door if you are not in there

UWA Support Services

There are a number of services available on campus through the Support Centre; these include counseling, disability services, financial aid, housing and learning skills. The Support Centre can be contacted on extension 2423 and is located on the 2nd floor of the southern wing in the Guild Complex.

The University Medical Centre provides general practice clinical services on campus. It is located on the 2nd floor of the south-west corner of the Guild Complex. Telephone 2118 for further details.
Safety Induction and Training

Overview of Induction and Training
The School of Plant Biology supports and promotes appropriate training for staff in occupational safety and health matters, in accordance with the UWA Occupational Safety and Health Policy. Training is provided in various ways, including formal training, mentoring and on the job training. Training includes:

1. Safety induction training for all staff, visitors and others as required.
2. Understanding of the duty of care, relevant legislation, University safety policies and procedures for all staff.
3. Training for safety and health representatives and other safety personnel.
4. Specific training in areas of safety hazards.

Training needs analysis
Supervisors should be aware that as well as general training for staff, in certain situations, safety training is prescribed in the regulations for specific hazards. Managers and supervisors should develop a system for identifying, arranging and recording training undertaken by all levels of staff. This should be regularly reviewed on an annual basis.

There are several resources available for UWA safety training. Safety and Health Office provides a number of training courses (http://www.safety.uwa.edu.au/courses) which are suitable for all staff. These are generally held through Organisational and Staff Development Services (OSDS http://www.osds.uwa.edu.au/) or can be made available to Schools by arrangement. In addition to training provided by the Safety and Health Office, external providers are also used for specific training such as first aid (http://www.safety.uwa.edu.au/courses#first) and safety and health representative training.

Inductions for staff, students and visitors:
Safety inductions are an essential part of the process to ensure that staff are made aware of the various safety roles and responsibilities within the University, general University safety and health policies and procedures, specific workplace hazards and requirements for safe working procedures.

Safety inductions (site specific safety induction), using a suitably modified checklist (http://www.plants.uwa.edu.au/481977) should also be conducted for post graduate students and visitors to the University who are accommodated in offices, laboratories, workshops or other workplaces at the University.

School wide safety inductions are conducted twice in the year by the School Safety and Health Representative. The following guidelines are to be followed by the supervisors:

1. Follow up items are actioned and copies of the checklist are retained.
2. It is the responsibility of the supervisor of the new employee to conduct or arrange for the safety induction to be completed.
3. The implementation of these safety inductions should form part of the broader induction of new staff when commencing employment.

**Recording of Training**

A detailed record of all health, safety, fire and evacuation training must be maintained by the department or section. Such records will enable a profile of a staff member’s competence to be established and the training that has been undertaken by the University.

**Training**

All radioisotope users at the University are required to have attended and passed the Unsealed Radioisotope Handling Course ([http://www.safety.uwa.edu.au/courses/radioisotope](http://www.safety.uwa.edu.au/courses/radioisotope)) within the first year of using radioisotopes, and preferably prior to starting such work.

**Welcome to the School of Plant Biology**


**Safety Induction Checklist**

All staff, students and visitors must complete the site specific safety induction ([http://www.plants.uwa.edu.au/481977](http://www.plants.uwa.edu.au/481977)).

**Frequency of Safety Inspections and Activities**

The aim of these inspections is to identify hazards and implement measures to eradicate problems and protect staff members and students.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
<th>Details</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Safety Inductions</td>
<td>Held bi-annually and compulsory for all new staff and students</td>
<td>School safety induction conducted by Greg Cawthray. Safety Induction Checklist to be completed, signed and forwarded to the School Manager. Copy given to employee/student.</td>
<td>Supervisor</td>
</tr>
<tr>
<td>Site specific safety induction</td>
<td>Upon commencement</td>
<td>To be completed within one week of new staff, visitors or students commencing in the School and copy to be provided to School Manager.</td>
<td>Supervisor</td>
</tr>
<tr>
<td>Training</td>
<td>Ongoing</td>
<td>Training requirements should be ascertained upon commencement in the School and undertaken as required when refreshing skills or operating new items</td>
<td>Supervisor</td>
</tr>
<tr>
<td><strong>Risk Management Assessment</strong></td>
<td>Ongoing</td>
<td>RMA to be undertaken prior to purchase of new items, prior to field trips and for lab specific hazards. Copy to be provided to School Safety Officer.</td>
<td>Supervisor</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Review Safety Signage</strong></td>
<td>Ongoing</td>
<td>All relevant safety signage in the labs, workspaces and in building to be reviewed on an ongoing basis to ensure availability of appropriate signage.</td>
<td>Supervisor</td>
</tr>
<tr>
<td><strong>First Aid Boxes</strong></td>
<td>Quarterly</td>
<td>All first aid boxes to be checked for availability of required first aid material</td>
<td>First Aid Officers</td>
</tr>
<tr>
<td><strong>Hazard and Incident Report Forms</strong></td>
<td>As and when required</td>
<td>A Hazard and or Incident Report Form should be completed as soon as hazards/incidents are identified as well as each time a new piece of equipment is introduced to the School. Forward to the School Manager.</td>
<td>Supervisor</td>
</tr>
<tr>
<td><strong>Electrical Equipment Testing</strong></td>
<td>Ongoing</td>
<td>Each item of electrical equipment in the School is required to be tested for safety on a regular basis as per UWA policy. (The due date for testing each item is written on the tag)</td>
<td>Supervisor</td>
</tr>
<tr>
<td><strong>Emergency Exit Checks</strong></td>
<td>Monthly</td>
<td>All emergency exits and exit routes should be kept clear at all times.</td>
<td>Fire Wardens</td>
</tr>
<tr>
<td><strong>Workplace Safety Inspections</strong></td>
<td>Quarterly</td>
<td>There is a requirement under UWA Responsibilities and Accountability for supervisors to carry out regular workplace inspections. S&amp;H Reps should be invited to attend. Complete relevant checklists as per the Lab/Workshop S&amp;H Schedule and forward to School</td>
<td>Supervisor</td>
</tr>
<tr>
<td>Safety Program</td>
<td>Frequency</td>
<td>Description</td>
<td>Manager.</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>School Safety Committee Meetings</td>
<td>Quarterly</td>
<td>Official forum through which individual and School safety issues may be raised and addressed.</td>
<td>Chair, Safety Committee</td>
</tr>
<tr>
<td>Fire Extinguishers</td>
<td>Six monthly</td>
<td>All fire extinguishers to be tested for effectiveness</td>
<td>Safety and Health</td>
</tr>
<tr>
<td>Fire Warden Training</td>
<td>Annually</td>
<td>Fire wardens to undertake training through the Safety &amp; Health Office</td>
<td>Building Fire Warden</td>
</tr>
<tr>
<td>Fire Drill</td>
<td>Annually</td>
<td>Annual fire drill for the Plant Biology Buildings</td>
<td>Safety and Health</td>
</tr>
<tr>
<td>Review of School Safety Plan</td>
<td>Annually</td>
<td>A School Safety Plan, including risk management schedule should be reviewed annually and acted on throughout the year.</td>
<td>Safety Committee</td>
</tr>
<tr>
<td>Testing of Emergency Equipment</td>
<td>Annually</td>
<td>Regular testing of emergency equipment (e.g. emergency showers, etc.) should be undertaken</td>
<td>S&amp;H Representative</td>
</tr>
</tbody>
</table>
Ethics and Issue Resolution

Ethics
The goal of research is to uncover missing links and solve problems. This can only be done when the process of research is true and honest. Solutions can not be based on questionable research technique or unreliable data. Plagiarism is highly unethical, and is viewed most seriously by the University. Research etiquette also includes the importance of adhering to ethical issues that ensure that processes are equitable and that due care is given to issues of intellectual property.

Some principles to consider are:

1. Ensure that all data collection is accurate and that analyses adhere to ethical use of statistical processes.
2. Give full acknowledgment to the source of all ideas. If they are not published then refer to them as “personal communication”.
3. Obtain full permission for use of equipment, land, plants animals etc.
4. Maintain high quality data sets (both a hard and soft copies) so that they can be retained and possibly resourced by others later.
5. Give due consideration to others in your work area.

Intellectual property
The University has detailed guidelines on intellectual property. Seek advice from your supervisor and School Manager.

Equity
The University of Western Australia has a legal responsibility to maintain equity under Acts of both the State and Commonwealth Governments.

The University is committed to a policy of equal opportunity in employment and education. This includes an environment free from discrimination. The University will act to ensure that its structures are free from direct or indirect discrimination on the grounds of sex, marital status or pregnancy, race, age, sexual preference, religious or political beliefs, impairment, family responsibility or family status.

If you need to speak to an equity and diversity advisor within Plant Biology, you can contact Alan Luks on Ex 2541, or information can also be found at http://www.equity.uwa.edu.au/page/148374

Students and staff are required to respect the rights of others.

Resolution of Safety and Health Issues
The UWA Policy can be found at: http://www.safety.uwa.edu.au/policies/.../policies/resolving_safety_&_health_issues

All hazards and injuries must be reported, investigated and resolved. Any unresolved issues should be dealt with in accordance with the following:

1. Notify Immediate Supervisor. If the issue is still unresolved...
2. Notify Safety and Health Representative or School Safety Officer. If the issue is still unresolved...

3. Notify Head or Manager of School. If the issue is still unresolved...

4. Notify Safety and Health Office. If the issue is still unresolved...

5. It is referred to the University Safety Committee

Safety and Health Representatives and senior Representatives of the University are authorised to notify WorkSafe if there is a risk of imminent and serious harm.
Notification of Hazards & Incident Reporting

Every member of the School has a duty to report any situation that they believe could constitute a hazard to any person that they cannot themselves correct. Hazard & near-miss forms are available from your Safety and Health Reps or the School Safety Officer.

The forms can also be found at:

- Incidents: www.safety.uwa.edu.au/forms/incident

All injuries and accidents MUST be reported to your Supervisor, Safety and Health Representative, and the School Safety Officer. These must be submitted to the Safety and Health Office within 24 hours (or as soon as practicable), to ensure workers compensation will be available where appropriate.

Safety Risk Management Procedures

The School of Plant Biology endorses the University Safety Risk Assessment and Management procedures. The risk assessment and management procedures are to be undertaken and implemented in labs, plant growth facilities, field trips and all other relevant areas and activities. Detailed guidelines can be seen on http://www.safety.uwa.edu.au/policies/safety_risk_management_procedures

For their respective area, all lab managers, supervisors and people who are responsible for safety and health at the School, should:

- investigate what hazards are and how to identify them;
- explain what safety and health risks are and how to quantify them; and
- detail strategies for implementing risk controls.

Investigation, Identification and Recording of hazards

A hazard is anything with the potential to harm life, health or property. Hazard identification is the process of identifying all hazards in the workplace.

Hazards may arise from the workplace environment, the use of plant or substances and from work practices. For hazard identification, it is important to understand the sources of hazards and the forms in which they may arise. Hazard identification involves the systematic investigation of all potential hazard sources and the recording of hazards identified.

This can be done by using the following techniques:

- breaking the workplace into work sectors or areas (and, if necessary, breaking down further into zones);
- breaking each sector down into tasks;
- developing a list of likely hazards for the work sector; and
• analysing the components of each task to identify the individual hazards present.

An important factor to consider is the people who may be exposed to risks from hazards, and how any individual characteristics may impact on exposure. Once gathered, the hazard identification data must be recorded so that it can be used for risk assessment activities and in determining appropriate control measures.

**Laboratory Emergency Response Procedures**
http://www.safety.uwa.edu.au/policies/..policies/laboratory_emergency_response

**Undertaking Risk Assessment**
Risk assessment is the process of assessing all of the risks associated with each of the hazards identified during the hazard identification process. In assessing the risks, three essential factors are considered:

1. The probability or likelihood of an accident occurring is evaluated;
2. The potential consequences are calculated or estimated; and
3. Based on these two factors, the risks are assigned priority for risk control through the use of a risk rating.

**The Risk Management Matrix**
A risk management matrix is a simple tool that can be used to assess a risk by evaluating a hazard’s likelihood of occurring and its potential consequences. Thus enabling the user to identify the appropriate response and prioritise the implementation of controls.

Below is an example of a risk matrix that has been adopted for the University to identify the risk a hazard poses to people. The risk assessment matrix is broken into the following steps:

1. Measurement of the potential consequences;
2. Measurement of the likelihood of the hazard occurring;
3. Quantifying the risk of the hazard by combining 1. and 2.; and
4. Identification of the risk of the hazard and the appropriate action required.

**Risk Control**
Risk control is the process by which the risks associated with each of the hazards present in the workplace are controlled. This is done having regard to the priorities (and any related time scales) determined during the risk assessment phase.

The primary aim of risk control is to eliminate the hazard giving rise to the risk(s), thereby eliminating the risk(s). Where this is not possible, risk control seeks to minimise risks by modifying or controlling the hazard and/or the associated work systems.

**Hierarchy of controls**
The hierarchy of controls is as follows:
- Eliminate the hazard.
- Substitute with a lesser hazard.
- Use engineering controls to reduce the hazard
- Administrative controls such as workplace procedures
- Personal Protective Equipment.

**Undertaking Monitoring and Review**

Monitoring and review is the final stage in the process. It is the means by which risk management is kept current and effective, as new hazards and those overlooked in the original process are identified and controlled.

Monitoring and review involves:

- the systematic re-implementation of the original steps of:
  - hazard identification
  - risk assessment
  - risk control


**Purchasing Safety Procedures**

The School supports the University purchasing safety procedures.


The School is committed to provide a safe working environment to all staff, students and visitors. To reduce risk due to purchase of poorly designed, faulty or hazardous equipment and materials all staff and students are advised to undertake risk management assessment and risk management planning prior to the purchase of items. Material Safety Data sheets are to be procured with the purchase of chemicals. The School requisition form is available online and advises staff and students to undertake the purchase of items after risk assessment and planning:

The form is available under quick links on [http://www.plants.uwa.edu.au/staff](http://www.plants.uwa.edu.au/staff)
Lab Safety and Inspections

Working in Laboratories
Safety in laboratories is an individual and personal responsibility in addition to the responsibility of the supervisor. Staff and students should ensure that they are aware and suitably trained in the safety considerations pertaining to each laboratory procedure they undertake and be aware of the procedures being carried out by others in the lab. Supervisors are to ensure that staff and students working with them are suitably trained. All staff and students have to successfully complete the lab safety course offered by the Safety and Health office before they can start their work in the laboratories. Lab Safety Course [http://www.safety.uwa.edu.au/page/8799](http://www.safety.uwa.edu.au/page/8799)

The following rules also apply to the use of the Plant Growth Facilities.

Definition
The definition of a laboratory (Australian/New Zealand Standard 2243.1:1997 1.4.16):
Any building or part of a building used, or intended to be used, for scientific or technical work which may be hazardous, including research, quality control, testing, teaching or analysis. Such work may involve the use of chemicals including dangerous goods, pathogens or harmful radiation, or processes including mechanical work that could be hazardous. The laboratory includes such support areas as instrument and preparation areas, laboratory stores and any offices attached or adjacent to the laboratory.

General Laboratory Rules
1. no eating or drinking in any of the laboratories
2. no smoking within the buildings
3. enclosed footwear must be worn at all times in the laboratories
4. strong soled shoes must be worn at all times within the buildings
5. laboratory coats must be worn when handling strong acids and bases or known carcinogens
6. long hair should be tied back if there is any risk of it becoming entangled in equipment or if you are working with a naked flame
7. no chemicals, glassware or equipment to be carried in the stair wells
8. chemical bottles to be carried in appropriate carriers
9. safety glasses are to be worn at all times in laboratory areas, and other personal protective equipment as needed
10. never run in laboratories or along corridors
11. all laboratory glassware must be washed, dried and returned to the appropriate location after use
12. laboratory benches must be left tidy at the end of working sessions, they must be cleaned of rubbish and wiped down
13. any service (water, lights, etc) that is required to be left on when it is unattended must carry a sign and dated notice that advises ‘Please leave On’ and your name and extension

14. fire escape routes must be kept clear at all times

The following procedures should also always be observed:

NEVER allow toxic materials to get into the mouth or touch the lips
NEVER pipette by mouth
NEVER put bottles of acids or alkalis on high shelves
NEVER pour water onto concentrated acids
NEVER sniff at chemical substances
NEVER store flammable solvents in a domestic refrigerator
NEVER store organic solvents and acids together

Safe use of centrifuges
- Before centrifuging, inspect tubes for cracks, inspect the inside of the rotor cup for rough walls caused by erosion or adhering material
- Do not operate centrifuge unless the cover is closed
- Do not centrifuge uncovered tubes. Use caps, stoppers, or Para film
- An unbalanced head (uncompensated weight) may cause the instrument to vibrate. The operator should check to be sure that heads are symmetrically loaded.

Discarding of sharps safely
- Discard needles, syringes, pipettes, broken glassware, glass slides and scalpel blades into the appropriate container. Make sure that metal and glass/plastics are in separate containers
- Discard sharps into a suitable plastic or heavy plastic lined container that is properly labelled. If items are not contaminated, the container may then be thrown into the normal trash
- Do not re-cap needles
- Do not use devices that cut needles off. These devices produce an aerosol
- Do not force sharps into a full container. Use a new container when the old one is full.

Labelling Chemicals
Any chemicals transferred out of their original packaging, which are not going to be used by the end of your working day, must be labelled in full. Do not use abbreviations as they provide insufficient information to emergency services personnel who may be required to attend. For example, FAA: Botanists know this to be a fixative that contains Formalin, Alcohol and Acetic Acid. To a fire fighter, it is an unknown hazard. Also, any solutions/stains/reagents you make need to be labelled with all the ingredients used to make the solution. for example, Alexander’s Stain:
Unless labelled with the ingredients, fire fighters would not know that it contains glycerol, which becomes highly explosive when in contact with nitric and sulphuric acids.

**How to obtain labels**


1. open Chem Alert
2. enter the chemical requiring a label into the terms to search box
3. right click on the product requiring a label and select view/print product report
4. select the desired label size from the Report Type drop down box
5. click on the label setup button and select the desired number of labels
6. and click view/print button

Chem Alert labels can be printed onto Avery Parcel Label sheets which come in a variety of sizes (1, 4, 8, etc per A4 sheet) and types (laser, colour, clear, waterproof, etc).

Any new chemical brought into the School must have the date of arrival written on the container.

Please include the following information:

- Date
- Your name
- Your extension number
- The lab room number

**GM Regulations**


The Gene Technology Act 2000 and Regulations 2001 regulates all dealings with genetically modified organisms (GMO's), and penalties apply (fine of up to $1.1 million and imprisonment of up to 10 years) for failing to comply with the regulations. [http://www.research.uwa.edu.au/453805](http://www.research.uwa.edu.au/453805)

More information can be obtained from the UWA Biological Safety Advisor Sylvia Lachberg, slachberg@admin.uwa.edu.au. You can also contact Susan Barker at sjbarker@plants.uwa.edu.au or Patrick Finnegan at pfinnega@cyllene.uwa.edu.au for details from within the School about usage of GMO's.

**Personal Protective Equipment**


Personal protective equipment (PPE) comprises a range of clothing and equipment which is worn by employees, students, contractors or visitors as appropriate to protect or shield their bodies from workplace hazards.

Section 19 of the Act states (in part):
• An employer shall, so far as is practicable, provide and maintain a working environment in which its employees are not exposed to hazards and in particular, but without limiting the generality of the foregoing, an employer shall where it is not practicable to avoid the presence of hazards at the workplace, provide its employees with, or otherwise provide for its employees to have, such adequate personal protective clothing and equipment as is practicable to protect them against those hazards, without any cost to the employees.

The Code of Practice for First Aid, Workplace Amenities and PPE: Part 4, provides guidance on the selection, provision and use of PPE. In addition it provides PPE requirements for specific hazards. The Occupational Safety and Health Regulations 1996 should also be used to provide guidance on PPE requirements. http://www.safety.uwa.edu.au/page/8750

In the Hierarchy of Controls (Elimination, Substitution, Engineering, Administration and PPE), personal protective equipment is considered the least satisfactory method in the prevention of work-related injury or illness and is only to be used when other measures are not feasible or cannot be implemented immediately. PPE should also be used however, to supplement or augment other means of hazard control, to further minimise the risk of injury.

Issues affecting the use of PPE include discomfort and inconvenience, and inappropriate or poorly-maintained equipment. It is therefore vital that problems caused by inadequate selection, fit and maintenance do not undermine the effectiveness of the PPE.

Types of PPE
PPE can be considered in the following categories, based on the type of protection afforded by the equipment:

1. Respiratory protection - eg disposable, cartridge, air line, half or full face
2. Eye protection – eg spectacles/goggles, shields, visors
3. Hearing Protection – eg ear muffs and plugs
4. Hand Protection – eg gloves and barrier creams
5. Foot protection – eg shoes/boots
6. Head Protection – eg helmets, caps, hoods, hats
7. Protection from falls - eg harness and fall arrest devices
8. Skin Protection – eg hats, sunburn cream, long sleeved clothes
9. Other personal protective equipment - eg protective clothing for cryogenic work or environments with high temperatures.

Responsibilities for PPE
Management must ensure that:

• the needs for PPE are assessed by a person who is competent to judge whether other methods of risk control can offer better protection of safety and health than the provision of PPE.
• professional advice is obtained, where necessary, to identify the most suitable types of PPE for the tasks to be carried out.
• training is provided to supervisors and employees to enable them to ensure the proper selection, fit, use, cleaning and maintenance of PPE.
• supervision and enforcement of the PPE policy is undertaken.
• evaluation of the effectiveness of the PPE program is carried out on a regular basis.
• suitable PPE is provided for visitors who may be exposed to hazards in the workplace. At UWA this includes students where appropriate. Equipment shall be properly cleaned before re-issue.
• all equipment shall comply with current relevant Australian Standards and should be stamped or labeled with an AS compliance marking. Existing PPE shall be re-assessed regularly to ensure compliance.

Employees:
1. must use the protective clothing or equipment in a manner in which he or she has been properly instructed to use it;
2. must not misuse or damage the clothing or equipment; and
3. must, as soon as practicable after becoming aware of any -
   o damage to;
   o malfunction of; or
   o need to clean or sterilize, the clothing or equipment, notify the person providing the clothing or equipment of the damage, malfunction or need to clean or sterilize the clothing or equipment.

Gloves
1. Ensure the correct glove type has been selected for the required task
2. Gloves MUST NOT be worn when opening/closing doors, have someone open the door for you if required
3. Gloves MUST NOT be worn in corridors or offices
4. Keep spare gloves in your lab coat pocket for use once you have left the laboratory and after entering another

Working in Fume Cupboards (FCs)
Decide whether a given operation needs to be done in a fume cupboard. Err on the side of caution. Check manufacturer Hazard Sheets if you use technical materials, or refer to the chemical's safety literature and labels for chemicals. For unfamiliar materials, check Materials Data Safety Sheets then seek additional advice through the Safety Committee.

Decide whether it would be prudent to work first on a small-scale trial. Do not over-rate the ability of even the best FCs to deal with massive sudden releases of toxic gases, or to contain fire and explosions from high-energy chemicals.
If the following 3 points cannot be met, cancel the proposed operation and move it to a suitable FC in another School if necessary.

- FCs are not designed for storage. Ensure the FC is as free as possible from all internal obstructions and clutter. The airflow across the sill can be locally reversed through objects being insufficiently behind the sash.
- Check that the exhaust flow (particularly), lights and all electrical, gas and plumbing services within the FC are working. A fire extinguisher within easy reach is a requirement of the new standards. If the airflow seems inadequate, inform the Safety Committee and they will arrange for a detailed check of the FC.
- Check draughts from windows and doors in the area will not affect the air flow across the sill.

Also:

Establish the experimental equipment well within the fume cupboard before any reagent is unstoppered i.e. place the equipment as far back in the fume cupboard as workable.

Work with the sash of the fume cupboard at the lowest possible position throughout the entire operation. Whenever any toxic hazard exists the operator's head should never cross the vertical plane within which the sash rises and falls. Dispose of products and excess reagents within the fume cupboard if they are toxic.

There is an upper limit (normally 2 litres), on the total amount of flammable solvents to be used or stored in a fume cupboard.

There are specific fume cupboards designed for use of Hydrofluoric acid, please ensure you check you are using the right fume cupboard before you start work.

Note where the fume cupboard isolation switch is in case of emergency to cut off mains power to FC, but still allow the FC to draw air. (i.e., all electrical equipment being used from power outlets of the FC will be turned off, but the FC itself will run to destruction).

**Key Points**

Is the exhaust running?
Are the amounts minimal?
Is the sash down?
Are you outside?

**Needle stick/sharps injury/exposure body fluids**

A specific injury report form is available for this type of incident/injury and can be located at: [http://www.safety.uwa.edu.au/page/31347](http://www.safety.uwa.edu.au/page/31347)

**Lab Safety Inspection Checklist**

The lab safety review checklist (below) is designed for supervisors and safety officers to ensure that everyone working in their lab is in a safe working environment. Below is an explanation of the things that are checked to ensure a safe laboratory. The column "remark/remedial action recommended" is there for you to suggest what you
think may fix the problem. The “to be done by” column, is for you to suggest who you think should rectify the problem. The “date completed” column is there for you to specify when the problem is resolved. The amount of time to get something fixed depends on how much of a hazard the problem presents. If there is imminent danger of a serious nature, then it should be fixed as soon as possible, if it’s not as dangerous, a week or 2 may be acceptable.

If you have any questions while filling this form out, please do not hesitate to contact your School Safety Officer or Safety and Health Rep for assistance.
# SCHOOL OF PLANT BIOLOGY SAFETY INSPECTION CHECKLIST

<table>
<thead>
<tr>
<th>Research Group and Occupants:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor:</td>
<td>Extension:</td>
</tr>
<tr>
<td>Lab Manager:</td>
<td>Extension:</td>
</tr>
<tr>
<td>Inspected by (print name):</td>
<td></td>
</tr>
<tr>
<td>Submitted to (print name):</td>
<td></td>
</tr>
<tr>
<td>Lab Supervisor signature:</td>
<td>Date</td>
</tr>
</tbody>
</table>

ALL recommended remedial action/s have been actioned - Signature: Date:

## QUESTION

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>Y/N n/a</th>
<th>REMARK/REMEDIAL ACTION RECOMMENDED</th>
<th>To be done by?</th>
<th>Date completed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Induction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Is there proof that new staff are inducted into this area?</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Placarding</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Is there placarding on the entrance to the lab showing safety symbols, PPE requirements, storage precautions and hazards?</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Are warning signs clearly visible?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Safe Working</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Is a hard copy of the School Safety Manual available in the lab?</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3.2 Are you aware where you can access it?

Current version can be found at: [http://www.plants.uwa.edu.au/for/staff](http://www.plants.uwa.edu.au/for/staff)

### 3.3 Does the lab maintain written procedures:

- SWPs (Safe Work Procedure)
- RAs (Risk Assessment)
- SOPs (Safe Operating Procedure)

### 3.4 Is area tidy, clean and well kept? No obstructions to cupboards, fumehoods, on sinks, in fridge.

### 3.5 Are walkways and doorways free of obstructions and well lit

### 3.6 Are all hazards and incidents reported (through the UWA hazard/incident reporting system) and investigated?

### 3.7 Are hazardous areas clearly recognisable?

### 3.8 Are after hours contact numbers for responsible occupants displayed?

### 3.9 Do people comply with the working in isolation policy eg after-hours/weekends?


### 3.10 If work has to be left unattended, for example: overnight, is all apparatus well-labelled and door labelling carried out?

### 4. Emergency Procedures
http://www.safety.uwa.edu.au/people/wardens/agriculture_central |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2</td>
<td>Are all occupants familiar with them?</td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Are the emergency procedures placarded in the lab?</td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>Are emergency phone numbers displayed?</td>
<td>University Emergency - 2222</td>
</tr>
<tr>
<td>4.5</td>
<td>Are Emergency contacts displayed in the lab or on main door signage?</td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>Are Emergency Exits to the lab clearly marked?</td>
<td></td>
</tr>
<tr>
<td>4.7</td>
<td>Are emergency plans practised regularly?</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td>Is emergency equipment readily available?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Spill kit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Eye wash station</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Safety shower (location)</td>
<td></td>
</tr>
<tr>
<td>4.9</td>
<td>Is the Safety Shower accessible and tested regularly?</td>
<td></td>
</tr>
<tr>
<td>4.10</td>
<td>Is the Eye wash hose accessible and tested regularly?</td>
<td></td>
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<td></td>
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<td>---</td>
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</tr>
<tr>
<td>4.11</td>
<td>Is emergency equipment checked monthly?</td>
<td></td>
</tr>
<tr>
<td>5. <strong>First Aid</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>Are the locations of first aid kits known?</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>Are kits present / accessible?</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>Are the contents of the kits checked regularly (every three months)?</td>
<td>School First Aid Officer to action this</td>
</tr>
<tr>
<td>5.4</td>
<td>Are there certified first-aiders in the immediate workplace?</td>
<td>First Aid Officer Ongoing</td>
</tr>
<tr>
<td>5.5</td>
<td>Are occupants aware who the nearest first-aiders are?</td>
<td><a href="http://www.safety.uwa.edu.au/people/fao">http://www.safety.uwa.edu.au/people/fao</a></td>
</tr>
<tr>
<td>6. <strong>Fire Protection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1</td>
<td>Is the Fire Extinguisher accessible with instructions intact?</td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>Are extinguishers present correct types?</td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>Has extinguisher been tested in last 6 months? (see tag)</td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>Is there clear access to the extinguishers?</td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>Has everyone been trained to use fire extinguishers?</td>
<td>*Can be organised by School through SHR and UWA Safety Office <a href="http://www.safety.uwa.edu.au/courses/faet">http://www.safety.uwa.edu.au/courses/faet</a> SSO, SHR &amp; UWA SHO</td>
</tr>
</tbody>
</table>
6.6 Are fire blankets immediately available in area?

6.7 Does everyone know what to do in the event of fire?  
http://www.safety.uwa.edu.au/policies/emergency_fire_and_evacuation

7. Electrical Safety  
http://www.safety.uwa.edu.au/policies/electricalpolicy

7.1 Is electrical equipment in good condition, especially switches / powerpoints?

7.2 Are all portable items tagged with test details?

7.3 Are any items due for retesting?

7.4 Are extension leads in use?

7.5 Are double adaptors in use?

7.6 Are there trailing leads?

7.7 Are local heaters checked?

7.8 Are other electrical items checked eg: air conditioners?

7.9 Are electrical appliances used in 'wet' areas?

8. Plant & Equipment
<table>
<thead>
<tr>
<th>8.1</th>
<th>Is there a log book for use?</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2</td>
<td>Are there warning labels/safe operating procedures near equipment?</td>
</tr>
<tr>
<td>8.3</td>
<td>Are safety guards used on mechanical equipment where required?</td>
</tr>
<tr>
<td>8.4</td>
<td>Is the maintenance schedule for med - high risk equipment adhered to?</td>
</tr>
<tr>
<td>8.5</td>
<td>Are maintenance records available?</td>
</tr>
<tr>
<td>8.6</td>
<td>Are gas cylinders safely secured?</td>
</tr>
<tr>
<td>8.7</td>
<td>Are there any gas cylinders not connected to equipment (i.e. lab storage)?</td>
</tr>
</tbody>
</table>

9. **GENERAL FACILITIES**

9.1 | Are eating/drinking areas isolated from work areas? |
9.2 | Are washing facilities adequate? |
9.3 | Is there adequate storage space (filing cabinets, shelves etc)? |

10. **PERSONAL PROTECTIVE EQUIPMENT**
<table>
<thead>
<tr>
<th>10.1</th>
<th>Is personal protective equipment available where necessary?</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2</td>
<td>Have staff been trained in its use?</td>
</tr>
<tr>
<td>10.3</td>
<td>Is personal protective equipment worn when necessary?</td>
</tr>
<tr>
<td>10.4</td>
<td>Is this equipment correctly stored and maintained?</td>
</tr>
<tr>
<td>10.5</td>
<td>Are the correct gloves being used for each task?</td>
</tr>
</tbody>
</table>

11. **Ergonomics**

| 11.1 | Are all frequently used items within easy reach?        |
| 11.2 | Is the work area set-up to prevent undue twisting of the neck and trunk? |
| 11.3 | Is there a chair with adjustable height provided at the work bench where sitting/standing work is performed? |
| 11.4 | Can the lab worker get close to the workstation when seated? For example leg space under bench |
| 11.5 | Are adjustments on all chairs functioning properly?     |
| 11.6 | Is the seat and backrest height of the chairs adjustable? |

12. **Manual Handling (MH)**
<table>
<thead>
<tr>
<th>12.1</th>
<th>Is there adequate space for all movements involved in the MH task</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.2</td>
<td>Are heavy/awkward objects stored between knee and shoulder height?</td>
</tr>
<tr>
<td>12.3</td>
<td>Are correct MH techniques/ equipment used for lifting heavy/awkward or unstable items?</td>
</tr>
<tr>
<td>12.4</td>
<td>Is a step stool or step ladder readily available?</td>
</tr>
<tr>
<td>12.5</td>
<td>Are trolleys readily available?</td>
</tr>
</tbody>
</table>

**13. Chemical Safety**

13.1 Have occupants been trained to safely handle chemicals and deal with chemical spills?

13.2 Are occupants aware of chemical hazards?

13.3 Are occupants following correct safety procedures?

13.4 Are Material Safety Data Sheets (MSDS) held for all substances?

13.5 Are they readily available in hard copy?

13.6 Is UWA Safety and Health contacted when an MSDS is not available on Chem Alert?

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7 Does the lab have an up-to-date inventory of its chemicals (preferably via Chem Alert)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.8 Does the laboratory maintain a hard-copy record of the names, quantities and locations of all chemicals being held there?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.9 Are occupants wearing appropriate protective equipment, e.g. appropriate footwear, safety glasses, gloves, and laboratory coats?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.10 Are all chemical containers properly labelled (including chemicals that have been decanted)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.11 Does labelling include class labels (diamonds)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.12 Is there adequate storage space for chemicals?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.13 Are they stored above eye height?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.14 Are chemicals properly stored? (Segregation of incompatible chemicals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.15 Are correct containers being used to store substances?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.16 Is there appropriate secondary containment to prevent spread of spills? Is there bunding or spill trays for the storage of liquids?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>13.17</td>
<td>Are flammable chemicals stored in fireproof cabinets?</td>
<td>SHO</td>
</tr>
<tr>
<td>13.18</td>
<td>Are flammable cabinets at least 3 m from powerpoints?</td>
<td></td>
</tr>
<tr>
<td>13.19</td>
<td>Are all chemical storage refrigerators spark-proof?</td>
<td></td>
</tr>
<tr>
<td>13.20</td>
<td>Are refrigerators suitably labeled (no food, no drink)?</td>
<td></td>
</tr>
<tr>
<td>13.21</td>
<td>Are safe decanting procedures in place?</td>
<td></td>
</tr>
<tr>
<td>13.22</td>
<td>Are spill kits clearly labelled and easily accessible?</td>
<td></td>
</tr>
<tr>
<td>13.23</td>
<td>Are winchesters and residue containers transported using carriers?</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Fume Cupboards</td>
<td></td>
</tr>
<tr>
<td>14.1</td>
<td>Are fume cupboards used when necessary?</td>
<td></td>
</tr>
<tr>
<td>14.2</td>
<td>Has/have cupboard/s been inspected and certified within the last 12 months?</td>
<td></td>
</tr>
<tr>
<td>14.3</td>
<td>Have they passed all tests?</td>
<td></td>
</tr>
<tr>
<td>14.4</td>
<td>Is the airflow checked each day?</td>
<td></td>
</tr>
<tr>
<td>14.5</td>
<td>Are they kept clear when no experiments are being conducted?</td>
<td></td>
</tr>
<tr>
<td>14.6</td>
<td>Are ‘experiments in progress’ labeled, and procedures outlined for emergency preparedness?</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>15. <strong>Waste Disposal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.1</td>
<td>Are staff familiar with waste disposal procedures?</td>
<td></td>
</tr>
</tbody>
</table>
| 15.2 | Are procedures for chemical waste disposal followed?  
> Disposal of chemical waste to be organised with Greg Cawthray, Plant Biology Chemical Safety Officer |
| 15.3 | Is a glass bin being used? |
| 15.4 | Is a sharps bin being used? |
| 15.5 | Where appropriate, are waste containers available for biohazards waste, toxic or carcinogenic chemicals, other chemical waste, and radioactive waste?  
> Disposal of chemical waste to be organised with Greg Cawthray, Plant Biology Chemical Safety Officer  
<p>| 15.6 | Are waste containers labelled appropriately? |
| 15.7 | Are appropriate segregated waste disposal containers being used (plastic, no more than 5L)? |
| 15.8 | Is chemical waste labelled correctly? |
| 16. <strong>Radiation Safety</strong> |<br />
| 16.1 | Is the laboratory used for radiation work? |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2 Is the laboratory labelled with radiation signage?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.3 Are Radiation Badges used by lab personnel?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.4 List of users of badges available?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.5 Wipe test conducted in lab and log book easily located and in good condition?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.6 Frequency of wipe tests?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General Comments

#### Definitions
- **RA:** Risk Assessment
- **SOP:** Safe Operating Procedure
- **SWP:** Safe Work Procedure
- **Ergonomics:** Involves fitting the job to the worker and not the worker to the job. It is the science of adapting workstations, tools, equipment and job practices to be compatible with the individual worker and thus reduce the risk of injury due to risk factors.
- **Manual handling (MH):** Any activity requiring the use of force exerted by a person to lift, lower, push, pull, carry or otherwise move, hold, restrain any animate or inanimate object.
- **PPE:** Personal Protective Equipment
- **Chem Alert:** Web based chemical inventory system which produces material safety data sheets (MSDS) and assist in chemical stock management.
Electrical Safety

Please see the UWA electrical and tagging policy: http://www.safety.uwa.edu.au/page/8815

All electrical equipment in the school will be tested regularly according to the policy.

For injuries and/or hazards relating to electrical shocks and equipment, these MUST be reported to the UWA Senior Electrician IMMEDIATELY on 6488 2036 as well as the UWA SHO on 6488 3938 or after hours on 6488 2222.

Hazards

If you spot any form of electrical hazard, please stop work in that area until the fault can be corrected.

It is against University policy to allow people to bring in electrical equipment from home unless it has been checked by Facilities Management. All heaters are to have a 1-hour timer attached, and no bar heaters are permitted unless they are existing units that are fixed to the wall.

Report any faults to the School Manager and complete an Incident/Injury Form if needed (See form in Section 3). All electrical incidents/shocks MUST immediately be reported to the UWA Senior Electrician (ext 6488 or 2036) and the School Safety Officer.
Chemical Safety

The chemical safety officer is Greg Cawthray ext 1789 or gcawthra@plants.uwa.edu.au

General Information

All chemicals stored in plastic containers must be checked for brittleness on an annual basis.

Many chemicals are known to be toxic, some are even known carcinogens. Comparative toxicity varies enormously. You should always read the Material Safety Data Sheet (MSDS) for every chemical you plan to use. If you do not understand the MSDS, please consult your Safety and Health Rep or the School Safety Officer before you begin working with the chemical.

Regard all substances as hazardous unless there is definite information to the contrary.

1. It is the clear responsibility of anyone ordering any chemical to use, store and dispose of all that chemical in a completely safe manner. All chemicals must be accounted for at the conclusion of a project.

2. The users MUST supply/ensure that a hardcopy of the MSDS is available for archiving in the laboratory MSDS folder where the chemical is to be used.

3. Safety carriers are to be utilised for transporting glass or plastic bottles with a capacity of two litres or greater. Exercise particular care when carrying containers of mutually reactive substances. If you cannot find an approved carrier a sturdy bucket is an acceptable substitute.

4. All spills must be cleaned up immediately and thoroughly. Be aware of the correct method for cleaning up various chemical spills. Most laboratories have a supply of vermiculite, which is a safe absorbent to deal with all spillages.

5. Always work with the smallest possible amounts of chemicals.

6. All chemicals must be handled with care. Due regard must be given to safety when using noxious or corrosive chemicals. Inform yourself of safety instructions relating to the use, handling and first aid procedures for the chemicals being used. If you don’t know, ask!

7. Do not use chemicals or equipment without the consent of the ‘owner’. Your chemical residues can ruin someone else’s ongoing experiment.

8. Fume-cupboards are to be used for removing gases, dusts, mists, vapour and fumes from laboratory operations. Always use a fume-cupboard when mixing chemicals and dealing with concentrated mixes such as acids and bases. On completion of the operation all equipment and chemicals must be removed from the fume-cupboard. Fume cupboards are not to be used for the storage of chemicals unless specifically required.

9. All containers of decanted chemicals, reagents, etc. must be fully labelled and include all details of hazards (toxicity, flammability). Labels are available from Chem Alert.
The University website gives the Policy and Procedures in detail on the policy for handling and storage of chemicals ([http://www.safety.uwa.edu.au/policies/handling_and_storage_of_chemicals](http://www.safety.uwa.edu.au/policies/handling_and_storage_of_chemicals)). In addition, the following table explains the chemical compatibility of common laboratory chemicals used.

**Incompatibility Table**

This table is not exhaustive, MSDS and other literature should be consulted as necessary to determine compatibilities of chemicals.

<table>
<thead>
<tr>
<th>Compound/Class</th>
<th>Avoid Storage Near or Contact with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid</td>
<td>Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates</td>
</tr>
<tr>
<td>Acetone</td>
<td>Conc. Nitric acid and sulfuric acid mixtures</td>
</tr>
<tr>
<td>Acetylene</td>
<td>Fluorine, chlorine, bromine, copper, silver, mercury</td>
</tr>
<tr>
<td>Alkaline metals</td>
<td>(Na, K, Mg, Ca, Al) Carbon dioxide, carbon tetrachloride or other chlorinated hydrocarbons, halogens, water</td>
</tr>
<tr>
<td>Ammonia (anhyd)</td>
<td>Mercury, chlorine, bromine, iodine, hydrofluoric acid, calcium hypochlorite</td>
</tr>
<tr>
<td>Ammonium nitrate</td>
<td>Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials</td>
</tr>
<tr>
<td>Aniline</td>
<td>Nitric acid, hydrogen peroxide</td>
</tr>
<tr>
<td>Arsenicals</td>
<td>Reducing agents (or will generate arsine)</td>
</tr>
<tr>
<td>Azides</td>
<td>Acids (or will generate hydrogen azide)</td>
</tr>
<tr>
<td>Bromine</td>
<td>Ammonia, acetylene, butadiene, methane, propane, butane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>Water</td>
</tr>
<tr>
<td>Carbon, activated</td>
<td>Calcium hypochlorite, oxidizing agents</td>
</tr>
<tr>
<td>Chlorates</td>
<td>Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials</td>
</tr>
<tr>
<td>Chromic acid, chromium trioxide</td>
<td>Acetic acid, naphthalene, camphor, glycerol, turpentine, alcohol or other flammable liquids</td>
</tr>
<tr>
<td>Chlorine dioxide</td>
<td>Ammonium, methane, phosphine, hydrogen sulfide</td>
</tr>
<tr>
<td>Copper</td>
<td>Acetylene, hydrogen peroxide</td>
</tr>
<tr>
<td>Cumene hydroperoxide</td>
<td>Organic or inorganic acids</td>
</tr>
<tr>
<td>Cyanides</td>
<td>Acids (or will generate hydrogen cyanide)</td>
</tr>
<tr>
<td>Flammable liquids</td>
<td>Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens</td>
</tr>
<tr>
<td>Fluorine</td>
<td>Isolate from everything</td>
</tr>
<tr>
<td>Hydrazine</td>
<td>Hydrogen peroxide, nitric acid, other oxidants</td>
</tr>
<tr>
<td>Hydrocarbons (propane, butane, benzene, gasoline, turpentine, etc.)</td>
<td>Fluorine, chlorine, bromine, chromic acid, sodium peroxide</td>
</tr>
<tr>
<td>Hydrocyanic acid</td>
<td>Nitric acid alkalise</td>
</tr>
<tr>
<td>Substance</td>
<td>Reaction</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hydrofluoric acid (anhyd)</td>
<td>Ammonia (aqueous or anhydrous)</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>Copper, chromium, iron, most other metals or their salts, alcohols, acetone, or other flammable liquids, aniline, nitromethane, or other organic or combustible materials</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>Fuming nitric acid, oxidizing gases</td>
</tr>
<tr>
<td>Hypochlorites</td>
<td>Acids (or will generate chlorine or hypochlorous acid)</td>
</tr>
<tr>
<td>Iodine</td>
<td>Acetylene, ammonia (aqueous or anhydrous), hydrogen</td>
</tr>
<tr>
<td>Mercury</td>
<td>Acetylene, ammonia, fulminic acid (produced in nitric acid-ethanol mixtures)</td>
</tr>
<tr>
<td>Nitrates</td>
<td>Sulfuric acid (or will generate nitrogen dioxide)</td>
</tr>
<tr>
<td>Nitric acid (conc.)</td>
<td>Acetic acid (or will generate nitrogen dioxide)</td>
</tr>
<tr>
<td>Nitric acid (conc.)</td>
<td>Acetic acid, aniline, chromic acid, acetone, alcohol, or other flammable liquids, hydrocyanic acid, hydrogen sulfide, or other flammable gases, nitratable substances; copper, brass or any heavy metals (or will generate nitrogen dioxide/nitrous fumes)</td>
</tr>
<tr>
<td>Nitrites</td>
<td>Acids (or will generate nitrous fumes)</td>
</tr>
<tr>
<td>Nitroparaffins</td>
<td>Inorganic bases, amines</td>
</tr>
<tr>
<td>Oxalic acid</td>
<td>Silver, mercury</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Oils, grease, hydrogen, other flammable gases, liquids, or solids</td>
</tr>
<tr>
<td>Perchloric acid</td>
<td>Acetic acid, bismuth and its alloys, alcohol, paper, wood, grease oils</td>
</tr>
<tr>
<td>Peroxides (organic)</td>
<td>Organic or inorganic acids; also avoid friction and store cold</td>
</tr>
<tr>
<td>Phosphorus (white)</td>
<td>Air, oxygen, caustic alkalies as reducing agents (or will generate phosphine)</td>
</tr>
<tr>
<td>Potassium</td>
<td>Carbon tetrachloride, carbon dioxide, water</td>
</tr>
<tr>
<td>Potassium chlorate</td>
<td>Acids, especially sulfuric acid</td>
</tr>
<tr>
<td>Potassium permanganate</td>
<td>Glycerol, ethylene glycol, benzaldehyde, sulfuric acid</td>
</tr>
<tr>
<td>Selenides</td>
<td>Reducing agents (or will generate hydrogen selenide)</td>
</tr>
<tr>
<td>Silver</td>
<td>Acetylene, oxalic acid, tartaric acid, fulminic acid (produced in nitric-ethanol mixtures), ammonium compounds</td>
</tr>
<tr>
<td>Sodium</td>
<td>Carbon tetrachloride, carbon dioxide, water</td>
</tr>
<tr>
<td>Sodium nitrite</td>
<td>Ammonium nitrate and other ammonium salts</td>
</tr>
<tr>
<td>Sodium peroxide</td>
<td>Any oxidizable substance such as methanol, ethanol, glycerol, ethylene glycol, glacial acetic acid, acetic anhydride, benzaldehyde, furfural, methyl acetate, ethyl acetate, carbon disulfide</td>
</tr>
<tr>
<td>Sulfides</td>
<td>Acids (or will generate hydrogen sulfide)</td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>Light metals (lithium, sodium, potassium), chlorates, perchlorates, permanganates</td>
</tr>
<tr>
<td>Tellurides</td>
<td>Reducing agents (or will generate hydrogen telluride)</td>
</tr>
</tbody>
</table>
**Material Safety Data Sheets (MSDS)**

Material Safety and Data Sheets are required to be available for every chemical in the School and should be located in a hardcopy form in an MSDS folder in the laboratory where the chemical is to be used. It is the users responsibility to ensure a hardcopy is available.

The MSDS gives you vital details on storage, handling and disposal of the chemical, along with first aid information. Please ask for help if you need help in obtaining or reading the MSDS’s. Help can be sought from either the School Safety Officer or the Safety and Health Reps.

MSDS’s can be found at the Chem Alert program at the Safety and Health Office web page: [http://www.safety.uwa.edu.au/page/8722](http://www.safety.uwa.edu.au/page/8722)

**Group Managers**

For most laboratories/research groups, there is a designated Chem Alert Group Manager that has been trained in the use and operation of Chem Alert as a chemical inventory tool, as well as for MSDS’s and labels. The Group Manager is your first point of contact for Chem Alert queries. For the School of Plant Biology, there is also the Chem Alert School Administrator, Greg Cawthray, to assist with queries.

**Chemical Warnings and Procedures**

**Specific Materials**

**Liquid nitrogen**

If you are handling liquid nitrogen, gloves and safety glasses must be worn to protect the skin and eyes from injury caused by burns from the extreme cold (i.e. -195°C). **Use extreme caution at all times when handling liquid nitrogen.**

Liquid nitrogen should not be transported in an enclosed vehicle; use an open-backed ute or similar vehicle. It should only be stored in specifically designed containers known as Dewar flasks, as they are made to withstand the rapid changes and extreme divergence in temperatures. These need to be stowed appropriately when used for road transport and emergency procedure guides carried in the cab of the vehicle. Private vehicles are NOT to be used for transport of Liquid Nitrogen.

Liquid nitrogen is sufficiently cold to condense oxygen from the atmosphere and quite large quantities of liquid oxygen may accumulate in an open vessel cooled by liquid nitrogen. The liquid oxygen will evaporate violently/explosively if the coolant is removed.

Only trained personnel should have access to dispensing the liquid nitrogen. A funnel should be used to dispense, and the top of the funnel should be partially covered to prevent splashing.

**Formic Acid**

Formic Acid decomposes over time to form carbon monoxide gas. This results in a pressure increase of approximately 7 times atmospheric by the end of a twelve month period of being unopened. **This can then result in an explosion.**
Please ensure that all Formic acid purchased has a pressure release cap, if not a label placed on it so the date of last opening can be recorded. It is recommended that the bottle be opened no less than every 2 - 3 months. Please dispose of any remaining Formic acid once your experimental needs have ceased.

**Organic Nitro Chemicals**

Organic nitro chemicals, such as picric acid and 2,4-Dinitrophenol, are **EXPLOSIVE WHEN DRY**. If you find any of these compounds you suspect to be dry, please contact the School Safety Officer, Safety and Health Rep., or the lab technicians immediately.

Do not attempt to open the jar yourself, as dried chemicals in the rim could explode with the friction of being opened.

**Dry Ice (solid carbon dioxide)**

Dry Ice is an asphyxiant and can cause severe frostbite burns, it has an expansion rate of approximately 32x. When handling, use safety glasses, leather or insulated gloves and coveralls. The temperature of dry ice is approximately minus 80°C, use extreme caution when handling and storing dry ice. Storage in a normal -20°C for long periods in not recommended as the dry ice will sublime to produce CO2 gas.

Use in a well ventilated area. Some plastics and rubbers may become brittle when exposed to dry ice.

**Cyanide**

Make arrangements with Greg Cawthray or Hai Ngo to do any work with cyanide in the School of Plant Biology.

Despite the extreme toxicity and speed of action of cyanides, appropriate chemical work can be done in complete safety provided the numerous methods of toxic exposure that can occur are appreciated and circumvented by rigid adherence to the safety rules.

**Working with cyanide is not permitted unless a qualified Oxygen Resuscitation First Aid Officer is in the building during the period in which cyanide is to be handled.** The First Aid Officer must be informed of the location of the work using the cyanide and have the resuscitation kit with them at all times.

**There must be a second person working at a not too distant location to the person handling the cyanide.** This person must be aware of the extension where the first aid officer can be located, the phone number for the ambulance, 0000, and the phone number of the emergency department at Sir Charles Gardener hospital, 0 9346 3380.

All use must be conducted in an efficient fume-cupboard and on the minimum scale. Display a cyanide warning notice on the apparatus. Eyes, mouth and nose must be protected from splashes by a face shield. Gloves should also be worn to prevent entry through broken skin. NOTE: some solutions of cyanide, such as dimethyl sulfoxide (DMSO)/cyanide are rapidly absorbed through the skin.

- Cyanide should NEVER be pipetted by mouth.
- Cyanide should NEVER be acidified.
- All equipment should be cleaned thoroughly after use.
• All cyanide should be returned to the locked poisons cabinet immediately after
use.

**Cyanide Disposal and Spillage**

• Seek advice/assistance.

• Evacuate personnel from the area.

• If safe to do so, ventilate the area well; wear breathing apparatus, safety
glasses and gloves.

• Instruct others to keep a safe distance.

• When cyanide solutions have been spilt, bleaching powder should be
scattered liberally over the spillage, or an excess of sodium hypochlorite
solution added. The treated spillage should then be mopped up into a bucket
and allowed to stand for 24 hours before running to waste, diluting greatly with
running water.

• Solid cyanides should be swept up and placed in a large volume of water in
which it can be rendered innocuous by adding an excess of sodium
hypochlorite solution and allowing to stand for 24 hours before running to
waste, greatly diluting with water.

**Cyanide Toxicity**

Lethal doses of NaCN and KCN are around 0.2g for an adult, say 5mL of a 1M solution, or
0.4mL of KCN saturated at room temperature. Alarming symptoms can occur at much lower
levels.

Gaseous HCN at 500 parts per million is immediately fatal through respiratory failure.

100ppm is dangerous to life in a few minutes.

**Perchloric Acid**

**Extreme caution should be used when handling Perchloric Acid. It is a 5.1
Oxidiser, and is highly corrosive.**

**Perchloric Acid must be stored as a oxidising agent and not as a corrosive
agent.**

Perchloric acid should only be used in fume cupboards with a wash down facility, as
the vapour may ignite materials on contact. The wash down should be used
frequently during the procedure involving the perchloric acid. Note that not all fume
cupboards have this wash down facility and thus are not compatible with perchloric
acid use. The digestion laboratory in the Soil Science building has 2 fume cupboards
that are perchloric acid compatible and all perchloric acid digestion work MUST be
carried out in this facility.

Perchloric acid is **violently incompatible** with the following things:

• Combustibles (eg. coal)

• Organic matter

• Dehydrating agents (eg. Phosphoric acid)

• Oxidising and reducing agents
• Heat sources

It is also incompatible with acids (specifically hydrochloric), antimony compounds, fluorine and sodium iodide.

When handling Perchloric acid, PVC or rubber gloves should be worn. When using large quantities, a rubber apron and rubber boots should also be worn. The wearing of a face shield is recommended.

In the event of a spillage, evacuate the area of all personnel. Clean up should only be attempted when the person is wearing rubber gloves, boots and apron, a face shield and respirator (type B – Inorganic and acid gas). The spill should be absorbed with dry, clean sand, then collected and stored in a sealable container to be sent for disposal.

GMA (Glycol Methacrylate)

This material is to be used ONLY in the Histology laboratory in the Botany building, contact Hai Ngo ex 3598.

Dress

• Lab coats must be worn at all times
• Shoes with solid uppers must be worn at all times
• Safety glasses or normal spectacles must be worn at all times
• Gloves must be worn at all times.*ONLY Butyl rubber and PVP polyethylene (4H) are suitable. Natural rubber or vinyl are NOT suitable, as GMA penetrates these in less than 1 minute.

Handling precautions

Liquid GMA must ONLY be handled in the fume hood. Specimens in liquid GMA must be stored in the fume hood.

Small spills (less than 10mL) can be washed down the sink with water and 5% Decon.

Larger spills must be wiped up with paper towels (to be polymerised in the vacuum oven) and then washed down with 5% Decon (available in a spray bottle on the window sill of the Histology laboratory) and water.

Contaminated glassware should be rinsed and fully washed as described in the washing instructions by the sink.

Any skin contact must be immediately washed with running water for 5 minutes, then with soap and water.

Any skin contact must be reported to the First Aid Officer.

There is limited space in the histology lab, so users are asked to keep their materials and bottles fully labelled and neat and clean, especially in the fume cupboard.

Agricultural Chemicals

An Agricultural Chemical is any substance - other than a fertiliser - used to eradicate, control or modify, plants, insects, vertebrate pests or plant diseases. Agrichemicals include compounds from many different chemical families, as well as a number of
biological products. Some are of low toxicity. Others are classified as poisons and can be hazardous if mis-used. A few are deadly or dangerous poisons. The use of any agricultural chemical for the control of pests, diseases, etc MUST be done in conjunction with the Glasshouse or Field Station technical staff. In many cases, the technical staff will apply these chemicals for you.

The first decision

Decide to use an agrichemical only after:

- Correctly identifying the pest, disease or weed and the degree of infestation or infection.
- Considering alternative control methods
- Assessing any previous experience of the problem, talk to the supervising staff member for that area.
- checking whether it is the right time to use the agrichemical, eg: stage of plant development, stage of life cycle of causal agent.

Selecting the product

Make sure the proposed product:

- Has a label recommendation for the intended use or target species.
- Is suitable for the crop variety and problem at the time of treatment.
- Presents least risk to human health.
- Will be prepared and applied by competent users with the correct equipment and safety procedures (i.e., Glasshouse and Field Station technical staff).
- Has a suitable withholding period.
- Presents minimum risk to livestock, bees, fish, domestic animals, wildlife and the environment.
- Will not be used for any more than the maximum number of recommended treatments.
- Is suitable for mixing with any proposed adjuvants or other agrichemicals.
- Will pose no hazard to crops sown or livestock grazed on the same area at a later date.

Safety in practice

- Read the label! - Provided you follow the instructions on the label, you are unlikely to harm either yourself or anyone else.
- Wear Protective Gear - Protective clothing is vital. Poisoning can occur, orally, dermally, by inhalation and also by general irritation to eyes and skin.
- Handle Concentrates Carefully - Greater precautions are necessary when mixing and filling than when spraying as you are handling the concentrated material.
- Personal Hygiene - Wash straight after you have finished using or mixing any agrichemical.
Know the symptoms of Poisoning - The symptoms of poisoning may include dizziness, nausea, headaches, rapid mood swings, muscle cramps and excess salivation. Severe poisoning may result in breathing difficulty, blurred vision, vomiting, diarrhoea, slow pulse rate, coma and finally death. Be prepared for the immediate first aid treatment of the active ingredient(s) of the agrichemical that you are using. If you require further information regarding the University Policy on the safe use of pesticides, you can discuss your needs with the Glasshouse and/or Field Station technical staff.

Also refer to the web site

**Waste Disposal**

The University has specific policies for the disposal of contaminated and non-contaminated, hazardous and non-hazardous, biological, clinical, radioactive, gaseous, asbestos and solvent wastes. The University Safety & Health website outlines these procedures in great detail.

http://www.safety.uwa.edu.au/policies#Chemical

If you have any waste chemicals or redundant chemicals in need of disposal, please complete the waste chemical manifest (see example on following page), and return to the Chemical Safety Officer.

All waste must be labelled clearly.

If you are unsure about any substance you are using or disposing of, contact your School Safety Officer or Safety and Health Rep immediately.

**Spillage clean ups**

1. Evacuate the area
2. Notify safety personnel
3. Only attempt to clean it up if it is a spill of less than 100mL. Do not attempt it if you are uncertain about what to do. Seek advice and assistance!!!

**Acid Spills (excluding hydrofluoric)**

Evacuate non-essential personnel from the spill area. Put on goggles and gloves before you begin to clean up. Circle the spill with the absorbent (vermiculite). Carefully fill in the entire circle to cover the spill. Evenly cover the wet absorbent with excess neutraliser (Na$_2$CO$_3$). Mix the neutraliser thoroughly with the wet absorbent and wait for 5 minutes. Scoop up the neutralized mixture and transfer carefully to waste bags.

**Basic Spills**

Evacuate non-essential personnel from the area. Put on goggles and gloves before you begin the clean up. Circle the spill with absorbent (vermiculite). Evenly cover wet absorbent with excess neutralizer (Citric Acid). Mix thoroughly with the wet absorbent and wait for 5 minutes. Scoop up the neutralised mixture and transfer carefully to waste bags.
Organic Spills

Evacuate all non-essential personnel from the spill area. Put on goggles, gloves and mask or respirator before you begin to clean up. Circle the spill with absorbent. Carefully fill in the circle with activated charcoal to cover the entire spill. Mix thoroughly and wait for 5 minutes. Scoop up the absorbed mixture and transfer to waste bags. Remember that this mixture could still be highly flammable, giving off flammable vapours.

The waste bags must then be labelled and the School Safety Officer or Safety and Health Rep notified to dispose of as soon as possible.

Waste Disposal Manifest

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Number</td>
<td>Lab Number</td>
</tr>
<tr>
<td>Item Number</td>
<td>Container Size</td>
</tr>
</tbody>
</table>

One copy of this form must accompany any waste taken for disposal. Another copy must be given to the School Safety Officer.
Biological Safety

For staff and students working in the School of Plant Biology research and teaching laboratories, there are important biological safety procedures which should be adopted. Staff and students must familiarise themselves with the Biological Safety Policies.


See [http://www.safety.uwa.edu.au/policies#Biological](http://www.safety.uwa.edu.au/policies#Biological) for biological safety requirements.

Please see the Safety Committee list for the name of the Biological Safety Officer.

**Biological Safety in Labs**

If you work with biologically hazardous material, the hazard must be clearly indicated using the standard biological warning signs giving the type and degree of risk and the name of the responsible person. Immediately adjacent to the biohazard symbol, a sign shall also be displayed stating “Danger - Infectious Material” or a similar appropriate warning.

Separate areas should be set aside for:

- preparation of media
- storage of biological materials
- sterilisation
- storage of sterile articles
- collection of specimens
- receipt of samples - spill trays should be provided

Protective clothing should be worn in microbiological laboratories and gowns or coats removed before leaving the laboratory for common rooms, office areas or home. Always wear protective clothing, particularly disposable gloves when handling samples and spilled material. Masks may be required if there is a potential for aerosol production.

Protective gloves should be worn in highly infective situations and personnel should disinfect their hands before and after using gloves, as minute holes may allow entry of micro-organisms. Gloves should be removed in such a way that the skin does not come into contact with external surface of the glove – ask your supervisor if you do not know or cannot remember the procedure. Elbow or foot operated taps should be available for washing hands as well as emergency showers.

Wounds and infections provide excellent routes for further infections. Any cut or abrasion should be treated immediately and covered with a waterproof dressing. Any infections particularly of the respiratory or alimentary tracts or hand wounds must be reported immediately.

Surfaces, storage areas, fridges, containers centrifuges and instruments should be decontaminated regularly and sterilised where practicable.
Safe use of deep freezers and refrigerators

All freezers and refrigerators must be checked and cleaned out periodically to remove any broken ampoules, tubes, etc. containing hazardous (toxic, infectious or harmful) material. Use rubber gloves during this cleaning. All infectious or toxic material stored in refrigerators or deep freezers must be properly labelled with the contents, name (or full initials) of the owner and the date (dd/mm/yy). Discard old specimens or samples as appropriate when they are no longer needed. Do not store chemicals, food or drink in laboratory refrigerators.

Personal Protection Equipment (PPE)

Gloves are provided for your protection. Use:

- Neoprene gloves for use with acids and bases
- Nitrile gloves for use with acids and bases except conc. nitric acid (eg 70%)
- Nitrile gloves when handling ethidium bromide.
- Latex (preferred) or vinyl gloves for use with biological specimens
- Change disposable gloves frequently. Once chemicals have penetrated the glove they are more of a hazard than a help as they will keep the chemicals close to the skin
- If using non-disposable gloves for long periods of time consult a glove chemical resistance guide to see how long it is safe to use them.
- Do not use gloves you believe to be in poor condition. Consult your supervisor.
- Do not use:
  - “touch ‘n’ tuff” nitrile gloves for nitric acid at concentrations above 10%
  - latex or vinyl gloves for protection against hazardous chemicals given their high permeability to water etc.
  - Lab coats and safety glasses are available in the lab if you do not have your own. Use them when handling chemicals or biological material.

Safety Cabinets

Safety equipment includes class II biological safety cabinets (BSCs), enclosed containers, and other engineering controls designed to remove or minimise exposures to hazardous biological materials. The class II biological safety cabinet (BSC) is the chief device used to provide containment of infectious splashes or aerosols generated by many microbiological procedures. A BSC has an inbuilt UV light for self sterilisation. It should be operated for at least ten minutes at a time with the UV guard in place when sterilisation is desired (typically before and after biologically hazardous lab procedures). There are no class II biological safety cabinets in Plant Biology laboratories. All users using biosafety cabinets in labs located in other Schools must comply with their standard procedures and undergo their lab specific induction.

There are 3 types of biological safety cabinet, Class I, Class II and Class III. [Complete details of the construction and performance requirements of these
cabinets are given in Australian Standard AS2252 - 1985, Biological Safety Cabinets Parts 1, 2, & 3.

Decontamination

Disinfectants
Whenever possible, decontamination should be achieved by sterilisation in an autoclave (steam heat under pressure). Disinfectants should only be utilised where sterilisation is not possible e.g. large spaces, surfaces and delicate instruments. Disinfectants should be chosen on their effectiveness to deal with the specific type of micro-organism.

The main uses for disinfectants are:

- washing - discarded containers, re-useable pipettes etc;
- wiping down benches and work surfaces at the end of use;
- regular cleaning of equipment - water baths, incubators, centrifuges, freezers, refrigerators.

The following are some commonly used disinfectants:

- Ethyl or isopropyl alcohol - 80% aqueous solution;
- Chlorine as hypochlorite solution;
- Iodine in aqueous or alcoholic solution;
- Phenolic disinfectants - Lysol, Chloroxylenol.

Sterilisation
Steam heat autoclaves are utilised for sterilisation. Only properly trained staff should use the autoclave and care must be taken to ensure the load reaches the required temperature and remains at that temperature for the prescribed time. Visual indicators such as Browne's tubes or heat sensitive autoclave tape should be used routinely. Monthly checks of sterilising efficiency should be carried out by using spore strips. Times for sterilisation must be determined according to the load. Minimum sterilisation times after attainment of the required temperature are:

- 15 minutes at 121°C
- 2 minutes at 132°C

Guidelines for the disposal of biological waste

Waste Disposal
All infectious wastes should be disposed of in accordance with both Commonwealth and State regulations and the following procedures should be followed:

- All contaminated waste material shall be sterilised, preferably by autoclaving, before disposal, preferably by incineration;
- Culture or fluids which may contain viable organisms or viruses shall not be poured into sinks or drains;
- Solid contaminated materials shall not be placed in waste bins;
• All samples, remains, disposable equipment, animal carcasses, tissue, fluids, faeces and bedding should be regarded as contaminated;
• Aerosol cans or other sealed containers may explode if autoclaved or incinerated and must be surface sterilised only (using a suitable procedure);
• Re-useable contaminated glassware should be disinfected or autoclaved or both before cleaning.

For emergency procedures concerning biological spills see: http://www.safety.uwa.edu.au/policies/laboratory_emergency_response


Sharps disposal requirement in biological procedures
'Sharps' require particular care before disposal. They should be: placed in a container at the site of use in a manner which should not incorporate cutting, bending or manipulation which may release aerosols or splatter contaminated fluids. Needles should not be clipped, broken, bent, recapped or otherwise manipulated by hand. For details see http://www.safety.uwa.edu.au/policies/sharps

The ‘sharps’ container should be:
• clean, puncture-resistant, leak-proof, shatter-proof and able to withstand heavy handling
• clearly labelled with the nature of the contents, distinctively coloured and display the universal biohazard label
• labelled ‘Clinical Waste’
• available in multiple sizes and shaped in such a way that it can be used on shelves or trolleys
• easy to assemble and stack
• designed with an opening that is accessible and safe to use
• sealed when ready for disposal and capable of being handled with no danger of the contents spilling.

Sharps disposal protocol
• Needles and syringes are to be discarded only into approved containers of the BUNZYL (needles only) or SHARPSAFE types.
• NEVER attempt to replace the cap on a needle after use as this may lead to a needle-stick' injury
• contact your supervisor when a sharps container requires disposal.

Recombinant DNA Techniques
Researchers who wish to carry out any experiment which involves the production of recombinant DNA molecules must submit a proposal giving details of the project to
the UWA Institutional Biosafety Committee (IBC) for approval. For details please see 
http://www.research.uwa.edu.au/485150

For advice, contact the School Biological Safety Officer.
Radiation Safety

Working with Radioactive Materials in Plant Biology

The following procedures have been modified from those available on the Safety & Health website to make them specific for Plant Biology.

http://www.safety.uwa.edu.au/page/8820

Please contact the School Radiation Safety Officer (SRSO) for assistance if required.

Before doing any work with radioactive material please obtain a personal monitoring badge (see below) and to organize to do the Unsealed Radioisotope Handling Course.

You will also need to obtain a copy of the working rules for use of radioactive materials and sign the register kept by the SRSO to confirm you have read and understood the rules.

Any advice concerning radiation safety should in the first instance be obtained from your local SRSO.

More information can be obtained from the Safety & Health website


You need to obtain approval from the SRSO to use the Neutron Moisture Probe (Nuclear moisture density gauge).

Training

All radioisotope users at the University are required to have attended and passed the Unsealed Radioisotope Handling Course (http://www.safety.uwa.edu.au/courses/radioisotope ) within the first year of using radioisotopes, and preferably prior to starting such work.

Personal Radiation Monitoring

- Personal radiation monitors are required to be worn by all persons handling radioisotopes.
- These can be arranged through your SRSO, and through Safety and Health.
- Films in the monitors are changed over every three months and sent for analysis. You will be contacted if you have had an unacceptably high dose.

You will need to provide an account number when ordering your monitor so that the cost can be charged. Be aware that there is an extra charge ($40-150 depending on how quick you need the monitor) for monitors ordered out of cycle. You should also provide the SRSO with your email address and phone number when ordering the badge.
Radioisotope Laboratories

Please see the SRSO to find out which laboratories are registered for the use of radionucleotides. When working in these laboratories you must follow the local working rules http://www.safety.uwa.edu.au/page/9559

Laboratory Emergency Response Procedures are displayed in all laboratories and can be accessed at http://www.safety.uwa.edu.au/policies/radioactive_spill_emergency.

If you have a spill (or some other emergency incident) in a radioisotope laboratory you must submit an incident / accident report to the SRSO. The form can be obtained at http://www.safety.uwa.edu.au/forms/incident.

Protocols

All procedures involving radioactive materials at UWA require the user to have completed a protocol application before commencing the work. Protocol forms are available from the Safety & Health Office (SHO) or from the School Radiation Safety Officer (SRSO).

The forms must be completed, signed by the applicant and signed by the SRSO (thus ensuring that the appropriate school personnel are aware of the work proposed) before being sent to the SHO for a final assessment. The application is reviewed by the SHO and if approved, it is signed and issued with a protocol number. Copies of the approved protocol are sent to the SRSO and the applicant.

Any changes to an agreed protocol must be approved by the SRSO and SHO. Such changes may include alterations to the procedure as submitted, using larger activities or different radionucleotides or performing the work in different radioisotope laboratories (which would also need to be registered).

Ordering radioactive material

Before you can order radionucleotides you must have a protocol for use of that radionucleotide and the protocol must have been approved by the Safety & Health Office. Orders for radioactive material should be made through Jeremy Foster using the normal requisition form. He will forward the orders to the SHO. You need to include a note (fill in special instructions box on the requisition form) to Jeremy that the order is for a radionucleotide and must be ordered through the SHO. You also should include all the information listed below.

All orders must clearly state:

- UWA order number
- Supplier's name and correct address details
- Radionucleotides chemical name and product code
- Activity (Becquerels, Curies)
- Current protocol number
- Delivery address (Purchasing Officer will do this)

The orders are checked to ensure that the protocol is current and that the activity and location of use are within the UWA registration limits. Orders are normally faxed to the supplier on the same day that the order is faxed through to the SHO or when the
order form is received but we recommend you include the information on the date you wish to receive the order and the time at which the order must arrive with the supplier for shipping of fresh radioisotope.

In a small number of cases the supplier will require a permit to import certain prohibited radioisotopes. The application form is normally completed by the SHO, signed by the user and is then sent to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) for approval. ARPANSA charge a fee of $90 for each permit ($150 if urgent) to allow import through Australian Customs of non-medical radioisotopes.

**Records and Receipts**

In order to prevent radioactive materials from being mislaid or just forgotten and left, records following the movement of radioactive substances must be kept and regularly updated. Records must detail activities, physical form of radioisotopes, supplier, arrival date, use details, disposal method and disposal date. Comments could also be included on the form of packaging and perhaps the quality of the packaging. Signed receipts should be obtained where possible.

The records and receipts detailed above should be kept in the radioisotope laboratory you are using and you should provide these records to the SRSO in charge of that laboratory each month. If you are working outside Plant Biology it would be helpful if you provided a copy of the information to the SRSO for Plant Biology. Please make sure you fill in the required information when you work in the laboratories. If there is nowhere in the radioisotope laboratory to record the details of the radionuclides you have used please inform the SRSO.

**Wipe Testing**

Schools using unsealed radioisotopes are required to conduct monthly wipe tests of all radioisotope laboratories. You will need to make sure the wipe tests are being conducted in the laboratory that you work in. The results of the wipe test are required to be forwarded to the SHO within 10 working days of the start of the month. A summary form should be attached to the results. This will be done by the SRSO.

**Radioactive Waste Disposal**

You are responsible for the disposal of any radioactive waste that you produce. All solid radioactive waste must be correctly packaged and labelled for disposal (for information on how to do this see the safety and health website [http://www.safety.uwa.edu.au/policies/radioactive_waste_disposal_procedures](http://www.safety.uwa.edu.au/policies/radioactive_waste_disposal_procedures)). The waste will then need to be delivered to the Radioactive Waste Store, which is located in H Block at the QEII Medical Centre. The store is only open to receive waste every Thursday between 10:30 am to 11:00 am. For schools at QEII, the waste may be delivered to the Mortuary ramp in the basement level of G Block between 10:15 and 10:30 am each Thursday.

**Neutron Moisture Probe**

You need to obtain approval from the SRSO to use the Neutron Moisture Probe (Nuclear moisture density gauge). Guidelines for use of this equipment can be obtained at [http://www.safety.uwa.edu.au/policies/nuclear_gauges](http://www.safety.uwa.edu.au/policies/nuclear_gauges). All users must attend a Neutron Moisture Density Gauging Course (contact Safety and Health to
organise this course) and then obtain a license before using the equipment. Training in the field by an experienced user is also required. Keys for the probe storage shed can be signed out from the School Managers office after the user has been approved by the SRSO.

**Use of Radioisotopes**

By law, all work involving radioactive substances and/or the generation of ionising radiation has to be monitored by the Radiological Council. In simple terms, this means that facilities where work is carried out has to comply to strict safety regulations. Also the purchase and subsequent disposal of radioactive material is strictly monitored.

Within the Faculty of Natural and Agricultural Sciences there are several areas that have been classified as suitable for radioactive work. These areas have different ratings which restrict the types of activities that can occur there. All areas where radioactive work is carried out are monitored via bench swab testing on a monthly basis to ensure that safe work practices are being adhered to. Staff and students who intend to use radioisotopes in the course of their studies have to attend a Compulsory three-day course on safe handling procedures for radioisotopes.

http://www.safety.uwa.edu.au/page/8799

The course is run in February and June/July of each year with several sessions being held. This serves to provide a basic introduction to the safety practices involved, staff that attend this session are expected to attend the full course in the following year.

Before any work can commence using radioisotopes, a protocol needs to be submitted to the School Radiation Safety Officer and then approved by the Safety & Health Office. Isotopes cannot be purchased for a project until the protocol has been approved. All purchases must be directed through the Safety and Health Office.

Staff or students using radioisotopes should contact their local radiation safety officer so that they can be issued with a radiation-monitoring badge. Please contact the Radiation Safety Officer for further information.

The following information on radiation is from the UWA Safety and Health web page, please refer to:

http://www.safety.uwa.edu.au/policies/.../policies/radiation_safety

**University Policy Statement**

The University is committed to ensuring the safety, health and security of staff, students and others who are on University premises and are working with ionising or non-ionising radiation. Under these circumstances there are special risks due to the nature of the hazard. These risks may have implications for those directly exposed or their offspring and may become apparent in the short or only after an extended period of time.

This policy particularly applies to employees and students whilst performing tasks using equipment or substances that fall into the following categories.

- Laboratory Emergency Response Procedures
- X-ray equipment
• Radioactive materials
• Lasers
• Ultraviolet light / Transilluminators
• Radiofrequency radiation
• Microwave ovens and radiation
• Neutron moisture gauges / density gauge guidelines
• Electric and magnetic fields
• Personal radiation monitoring
• School Radiation Safety Officers (SRSOs)
• Local Laser Safety Officers (LLSOs)

Legislation
The Radiation Safety Act 1975 and the Radiation Safety (General) Regulations (1983-1997) provides a number of restrictions to the use of potentially hazardous radiation producing equipment. The Act is administered by the Radiological Council, a statutory body set up under the Act.

The Act and Regulations refer extensively to current Australian/New Zealand Standards and NH & MRC Codes.
Working After Hours

Outside of 8am-6pm Monday-Friday

Staff and students who are on the premises after hours will need to carry either an ID card or Security Access card. Failure to produce either of these forms of identification when asked by Security staff will result in you being escorted from the premises.

Each individual is responsible for taking reasonably practical steps to ensure their own safety and personal security when working in isolation.

As far as practicable, the supervisor should be satisfied that the staff member, student or visitor understands the hazards that may be associated with the work and the procedures that should be followed to reduce risk, and that the person will work in a safe manner and be able to follow emergency procedures when left alone.

There are mandatory requirements to:

- identify hazards, assess risk and reduce risk
- have a means of communication in an emergency and a procedure for regular contact

As a minimum, the after-hours book should be filled out, Security should be notified of your presence on campus, your intended period of stay and the activity being performed. It may be possible for security to check on you during their usual rounds. Please talk to the school manager to discuss the alternatives.

In the case of an emergency the normal emergency response procedures should be understood and carried out. The campus emergency number is 2222. If a phone is not readily accessible, employees and students are not permitted to work alone.

Three categories relating to the work of Plant Biology staff and students have been identified.

1. Any After-Hours Work
   - The following apply to any after hours work:
     - complete the after-hours register
     - undertake all personal security measures e.g. lock doors, walk in well lit areas
     - request security personal escort as required
     - security to be notified of your presence and the intended period of your stay. It may be possible for Security to check on you on their usual rounds

2. Presence of Another Person
   - The following require another person to be present within the building for the time that the work is to be undertaken, and for that person to make periodic checks of the work area:
     - prolonged activity in cold rooms
     - use of the vacuum oven in the histology lab

3. Prohibited Activities
The following must not be undertaken after hours, even where another person is present:

- using mechanical devices e.g. grinders, motorised hand tools
- distillation processes
- wet chemical procedures involving solvents, strong acids and bases or strong oxidising agents
- aliquoting/use of newly supplied radioactive material i.e. that has not been diluted or reduced in activity from the supplier
- procedures that involve scheduled poisons e.g. cyanide or pesticides
- working with chemicals that, with only minimal use, can cause dizziness, disorientation, loss of consciousness, coma or death
- work such as acid digestion
- use of the autoclave
Vehicles

Using 4WD Vehicles

If you intend to use the 4WD vehicles in the School in an off-road capacity, you are required to complete the 4WD training course. These can be arranged through the Safety and Health Office at www.safety.uwa.edu.au/courses. Also please note that the vehicle recovery equipment is not stored in the vehicles, so please collect it before departing on any off-road field trips. The chief person to contact about the recovery equipment is Greg Cawthray (gcawthra@plants.uwa.edu.au ext 1789)

Trip plans for fieldwork must be submitted to the Head of School for approval prior to departure. The minimum size of a field party is two people. Persons who participate in fieldwork should be physically fit and have no existing medical conditions that could reasonably be expected to give rise to a life-threatening situation.

No more than ten hours in a 24-hour period may be taken up with driving, regular rest periods are strongly recommended. The capability to drive up to, but no longer than, the recommended ten hours, is at the sole discretion of the driver.

The driver is totally responsible for all aspects of preparation, maintenance of the vehicle and equipment, and the application and implementation of the guidelines. A check for roadworthiness of the vehicle and any towed appliances should be made prior to departure and daily thereafter for the duration of the trip. This check should include: tyres, radiator, oil levels, and battery condition.

Regular call-in schedules are required for any trips involving off-road or remote location work.

Using any School Vehicle

Drivers must be fully engaged in the work of the University and must hold a current licence of the appropriate class for the vehicle driven. The vehicles can be booked for a cost. Please check the cost with the Purchasing Officer (6488 2542) prior to booking. The rate charged covers fuel, insurance, general maintenance and replacement cost, it does not cover damage caused by misuse. Damage caused through misuse of the vehicle, eg. tyre, panel, interior damage caused by negligent or inappropriate use can be charged directly to the user up to the value of the non recoverable insurance. In the event of damage caused during unauthorised use, eg. unlicensed or improperly licensed driving or driving under the influence of drugs or alcohol, the driver will be held responsible for all repair costs that the insurer will not cover, including the possible full replacement cost of the vehicle.

Bookings can be made via the EZBook system, see the Purchasing Officer (ex 2542) for registration. Please make sure that you return the vehicle by the booked time. Also return the vehicle in good condition. If you find any faults, please report them immediately so they can be rectified. If you leave the car in a very dirty condition, it will be professionally detailed and the work charged to your account. There is a car wash bay behind the combined workshop.

The Plant Biology vehicles are located near the Combined Workshop building. The location of each vehicle is specified on the booking sheets. Keys are located in the Purchasing Office in the Botany Building room G17.
Use of University Vehicles Policy can be viewed at:

Working in the Field

UWA’s policy on working in remote locations and fieldwork can be found at
http://www.safety.uwa.edu.au/policies/remote
http://www.safety.uwa.edu.au/policies/field_work

Before you commence any fieldwork or go on any expeditions, you should have
undertaken appropriate first aid training. It is very important to follow instructions
given to you, avoid risks and under no circumstances go out alone. ALWAYS let
someone know your intended route, destination as well as expected time of return.
Always ensure that you report in when you get back. If you will be travelling off-road
then you are required to complete a University 4-wheel-drive course.

You are required to follow these steps when working in the field:

- Carry water
- Wear suitable clothing (including a hat) to avoid heat or low temperature
  stress
- Carry sun protection cream
- Carry rehydration salts and fluid
- People working in remote areas must be qualified in first aid
- Let someone know where you will be
- Inform someone of an expected return time
- Carry a fully stocked first aid kit and a snake bite kit (available from the First
  Aid Officer)
- Have someone with you (two other people would be ideal, but at least one)
- Have basic training in 4WD handling and snake awareness (see below for
  information on snake safety in the field)
- The University policy on working in the field is listed over the next 7 pages and
  can also be found at: http://www.safety.uwa.edu.au/policies/.../policies/remote
- Take a CDMA phone or satellite phone with you so you have better coverage
  than with a mobile phone
- Fill in your field trip work plan one week before you leave and have it signed
  off by Head Of School.
- Fieldwork/Expeditions

Being snake aware

In some work situations, encounters with snakes may be possible. Heed the following
suggestions and access the suggested web pages for more information.

- Keep to bare paths where possible
Avoid walking through vegetation

Wear suitable clothing (enclosed footwear and loose fitting full length trousers)

Familiarise yourself with emergency response procedures in the event of a snake bite

Make sure you have a snake bite kit as well as a comprehensive First aid kit when working in the field at all times.

Most snake bites occur when people accidentally step on snakes or when they are attempting to kill them. If a snake is encountered, withdraw from the location and report the incident to an appropriate person with the following details

1. Time
2. Location
3. Description of snake

Field work in remote locations & extended driving of University vehicles

All staff and students intending to carry out field trips and work in remote locations should be aware of the University policy on this subject, see


http://www.safety.uwa.edu.au/policies/remote

Completion of the one day 4 wheel drive training course is mandatory for all staff and students who wish to undertake a field trip involving remote work or the use of a 4 wheel drive vehicle. Training in the use of communications equipment is also necessary

Trip plans for fieldwork must be submitted to the Head of School for approval prior to departure. The minimum size of a field party is two. Persons who participate in fieldwork should be physically fit and have no existing medical conditions, which could reasonably be expected to give rise to a life-threatening situation.

A satellite phone is available to borrow from the Purchasing Officer (ext 2542) and should be used when traveling to off-road/remote locations, outside standard mobile phone areas.

No more than ten hours in a 24-hour period may be taken up with driving, regular rest periods are strongly recommended. The capability to drive up to, but no longer than, the recommended ten hours, is at the sole discretion of the driver.

The driver is totally responsible for all aspects of preparation, maintenance of the vehicle and equipment and the application and implementation of the guidelines. A check for roadworthiness of the vehicle and any towed appliances should be made prior to departure and daily thereafter for the duration of the trip. This check should include;

- tyres,
- radiator,
- oil levels,
• battery condition.

Regular call-in schedules are strongly recommended for any trips involving off-road or remote location work

UWA’s policy on working in remote locations can be found at http://www.safety.uwa.edu.au/policies/remote

Introduction

Staff and students who proceed on field trips and carry out work in remote locations must be aware that they place themselves in a situation where they are exposed to higher than normal levels of risk. This policy establishes administrative and Safety and Health arrangements for the conduct of field work in locations classified as "remote" and for the driving of vehicles over long distances or off road. The policy is based upon current practices observed within the University as well as those commonly used in other Commonwealth and State Government authorities.

Definitions

For the purpose of this policy, the following definitions apply:

1. Remote Work: defined both in terms of distance and inaccessibility as any work carried out at any non-permanently staffed University site and which entails:
   • working more than 5km from a frequently trafficked road, farmhouse or other facility with telephone or radio communications;
   • off-road in areas including river, inland waterways and estuarine locations where very little traffic is likely or where topographic features would make it difficult to summon help either from a farm or town.

2. Off Road: any location other than a major or minor formed road;

School Responsibilities

The Head of School is ultimately responsible for ensuring:

• the driver has an appropriate and current drivers license (domestic or international).
• the driver has completed either the University 4-wheel drive course, offered biannually or has undertaken a similar accredited course if off-road or remote work is to be undertaken.
• meeting the cost of any overnight accommodation for staff, in cases which require valid additional or unscheduled overnight stops.
• each University vehicle has a log book which is completed by the driver for every trip.
• vehicle users are aware of the procedures for working in remote locations, prior to departure on any trip.
• the roadworthiness of all vehicles at all times, including any hire vehicles.
Drivers Responsibilities

- They hold a current licence (recognised by WA Police) for the type and class of vehicle.
- The capacity for driving time of up to 10 hours maximum, is at the sole discretion of the driver.
- The driver is totally responsible for all aspects of preparation, maintenance of vehicle and equipment and the application and implementation of the guidelines.
- A check of the vehicle and any towed appliances (e.g. trailer or boat) for roadworthiness shall be made prior to departure and then a daily check is to be carried out for:
  - tyres (visual inspection of inflation and tread conditions);
  - radiator (water level);
  - oil level;
  - battery condition.
- Obtaining as much information as possible about the conditions that are likely to be encountered during the trip and making provision for them.
- Submitting a fieldwork plan prior to departure.
- In all cases where the driver is going to be in an off-road situation or remote location, to inform local authorities (e.g. police) of the planned driving regime. Regular call-in schedules may be appropriate and should be set up in advance in consultation with the local authorities.

Administrative Arrangements

1. A risk assessment of the work to be undertaken during the field trip should be carried out prior to departure. The nature of the work and the experience of the staff or students attending the field trip should be considered. In many cases it will be unsafe for people to be working alone. If it is considered safe to be working alone, suitable communication sources, equipment, survival supplies and first aid will be required to ensure adequate safety levels. [http://www.safety.uwa.edu.au/policies/field_work](http://www.safety.uwa.edu.au/policies/field_work)

2. Completion of the one day University 4 Wheel Drive course is recommended for staff and students who wish to undertake a field trip involving remote work or the use of a 4 Wheel drive vehicle. No other personnel are authorised to drive except in an emergency and this should be entered into a log book.

3. Local rules or modified procedures particularly appropriate to the School but consistent with this policy may be developed. Agreed rules must be complied with and personnel who deliberately expose themselves or others to risk by non-compliance are to be counselled and if necessary excluded from field work.

4. Trip plans shall be submitted to the School for approval by field trip leaders prior to undertaking field work and basic details provided shall include:
• a log book of prior vehicle inspections and the supplementary safety equipment. This should be signed by a senior administration or technical officer and kept in a secure location at the beginning and end of each trip. (This applies to University owned vehicles only);
• time and date of departure;
• expected time and date of return;
• major roads/towns to be covered "en route";
• approximate work area (map or grid reference);
• names of all staff and students in group;
• any agreed radio or telephone call-in schedules. Notification of local authorities of where you intend to be, for how long and when you will contact them again.

Transport
An appropriate type of vehicle is to be supplied for field work:
• normal sedans and station wagons are only suitable for bitumen and all-weather dirt roads;
• 4-wheel drive vehicles should be used for all off-road situations including mountainous terrain and desert areas.

All 4-wheel drive vehicles used for field work should be equipped with the following:
• diesel engine;
• a steel bull-bar capable of being used as a jacking point and of supporting at least 2/3rds of the weight of the vehicle;
• a rear bumper bar capable of being used in a similar manner to the bull-bar;
• air-conditioning.

The following items are strongly recommended for inclusion as vehicle equipment:
• driving lights (spot lights);
• long range water and fuel tanks;
• cargo crash barriers.

Where vehicles are to be used off-road or in remote locations appropriate spare parts, tools, recovery equipment and adequate supplies of emergency rations and water must be carried. (A comprehensive list of these items is detailed in Recommended Equipment for Field Work in Remote Locations). These items are to be checked in a log book prior to departure, with the log book to be held by the School Manager.

Field work may be cancelled if a suitable vehicle is not made available. Additional information relating to technical and mechanical aspects of vehicles and correct driving methods is contained in the 4 wheel drive vehicle training course booklet (obtained from the Insurance Officer extension 3214).
Communications
All vehicles for remote field work must contain a 2-way radio or satellite telephone with frequencies which include those of the Royal Flying Doctor Service and other appropriate Commonwealth and State Government authorities.

All personnel undertaking field work must be trained in the use of the communication equipment and liaise with local authorities as outlined above.

Clothing and Safety Equipment
The appropriate kind of safety equipment and clothing of an occupational nature needed for the field trip should be dictated by experience and common sense.

Where requested, the School must provide staff the necessary special items as part of their management and legal responsibility to provide a safe place of work and a safe system of work for employees. For outdoor work this may include the provision of hats, sunscreen, field boots and other clothing to protect against harsh climatic conditions which may be encountered. Students must provide their own protective clothing. The School may provide sunscreen and insect repellent.

Health
All people who participate in remote field work should be reasonably fit and have no existing medical conditions which could reasonably be expected to give rise to a life-threatening situation. If anyone is taking regular medication it is vital that adequate supplies are carried on the trip.

First Aid Equipment
Field work locations are University workplaces as defined by Safety and Health legislation and as such, compliance with relevant regulations is required. Regulations which concern first aid requires an employer to provide for every 25 people or part thereof, a dust proof first aid box or cabinet stocked with such medical supplies as are appropriate for treating injuries caused or likely to be caused to people, having regard to the work being carried out. In addition at least one person must have control of the use of the contents of the first aid box or cabinet. For field trips the box or cabinet should be portable, light, compact and durable as it may have to survive and remain sterile in adverse conditions and it should be stored carefully in the vehicle to prevent damage and be readily accessible. Such equipment is to be supplied by the relevant School, and the condition of such equipment is to be monitored and a log kept.

A person trained in first aid should be included as a member of each field trip group. A first aid kit should only be seen as supplementary to the essential requirements of training in first aid for field trip personnel and reliable 24 hour communication facilities.

The School should encourage relevant staff and students to attend First Aid Training on a regular basis. First Aid courses can be arranged via Organisational and Staff Development Services (OSDS) the School or Safety and Health Office.

Driving For Extended Periods or In Remote Areas
Where this type of driving is to be undertaken, the following should be observed:
• No more than 10 hours in a 24 hour period should be taken up with driving. The total time spent travelling, inclusive of breaks, should not exceed 12 hours, even where the driving is shared;

• A rest period of 20 minutes should be taken on completion of each 3 hour period of driving, or as required. Where driving is shared, each driver shall drive for no longer than 3 hours in succession;

• Ordinary duty (which does not involve driving duty) combined with driving duty shall not exceed 12 hours in any period of 24 hours;

• Alcohol shall not be consumed or prescription drugs which may affect the ability to drive safely, 8 hours prior to working or during the period of the journey by any person involved with driving duties;

• The distance which can reasonably be covered during the space of a day's driving will be governed by the above and
  - driver fatigue;
  - legal speed limits;
  - climatic conditions & weather;
  - type of vehicle used.

• The general well-being of the driver, in particular fatigue, is paramount and takes precedence over agreed guidelines particularly when the driver is subject to fatigue.

• The time at which the journey is to be undertaken, its duration, and the distance to be covered, shall be reasonable in the circumstances and be planned in advance.

• Provision shall be made for regular and adequate rest breaks to avoid driver fatigue.

• If the driver has to perform duty immediately before or after the official journey; the duration of the journey shall be limited accordingly.

• Wherever practicable more than one driver shall travel in vehicles, especially where all or part of the journey is to be undertaken in isolated areas or under arduous climatic conditions.

• There should be no likelihood that the undertaking of any particular journey will result in unusual risks.

### Recommended Equipment for Field Work in Remote Locations

<table>
<thead>
<tr>
<th>Essential Items</th>
<th>Remote Area Items</th>
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<tbody>
<tr>
<td>Vehicle Handbook</td>
<td>Wheel chains</td>
</tr>
<tr>
<td>Maps and compass</td>
<td>Jerry cans</td>
</tr>
<tr>
<td>First-aid kit</td>
<td>CB Radio or satellite phone</td>
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<tr>
<td>Fire extinguisher</td>
<td>Pick</td>
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<tr>
<td>Knife (pocket or sheath)</td>
<td>Radiator blind or tarpaulin</td>
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<tr>
<td>Trouble lamp</td>
<td>Flares</td>
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<td>Portable warning signs</td>
<td>GPS</td>
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<td>EPIRB</td>
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<td></td>
<td>Workshop manual</td>
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<tr>
<td></td>
<td>Survival book</td>
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<tr>
<td></td>
<td>Survival kit</td>
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<tr>
<td><strong>Miscellaneous Repair Items</strong></td>
<td><strong>Recovery Equipment</strong></td>
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<tr>
<td>Aero start</td>
<td>Duct or Gaffers tape</td>
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<tr>
<td>Spare nuts, bolts, washers etc</td>
<td>Self amalgamating tape</td>
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<tr>
<td>Gasket cement</td>
<td>Insulation tape</td>
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<tr>
<td>PVC fuel hose</td>
<td>High lift jack</td>
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<tr>
<td>Contact cement</td>
<td>Leather gloves</td>
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<tr>
<td>Silicone adhesive</td>
<td>Snatch strap</td>
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<tr>
<td>Araldite, Plastibond etc.</td>
<td>Rope</td>
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<tr>
<td>Radiator stop leak</td>
<td>Winch (including wire rope and handles)</td>
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<tr>
<td>Fencing wire</td>
<td>Shovel</td>
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<tr>
<td>Dewatering fluid (eg CRC)</td>
<td>Snatch block</td>
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<td></td>
<td>Axe</td>
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<td></td>
<td>Shackles</td>
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<tr>
<td></td>
<td>Air Compressor</td>
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<tr>
<td><strong>Items for both Petrol &amp; Diesel Engines</strong></td>
<td><strong>Additional Items Required for Petrol Engines</strong></td>
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<tr>
<td>Drive belts (eg. fan &amp; power steering belts etc)</td>
<td>Ignition coil</td>
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<tr>
<td>Radiator and heater hoses</td>
<td>Condenser</td>
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<tr>
<td>Oil filter</td>
<td>Spark plugs</td>
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<tr>
<td>Fuel filter</td>
<td>Points</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Distributor cap</td>
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<tr>
<td>Wire</td>
<td>Rotor arm</td>
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<tr>
<td>Fuses and fusible link</td>
<td>High tension leads</td>
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<tr>
<td>Globes</td>
<td>Fuel pump repair kit</td>
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<tr>
<td>Oil seals for input/output shafts</td>
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<tr>
<td>Wheel bearings</td>
<td></td>
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<tr>
<td>Tyres and tubes</td>
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<tr>
<td>Valves for tubes</td>
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<tr>
<td>Tyre/tube patches, glue etc.</td>
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<tr>
<td><strong>Tools</strong></td>
<td><strong>Lubricants etc</strong></td>
</tr>
<tr>
<td>Wheel brace</td>
<td>Engine oil</td>
</tr>
<tr>
<td>Comprehensive tool kit (with all necessary size sockets and spanners)</td>
<td>Transmission oil</td>
</tr>
</tbody>
</table>
Heat Stress

When working in hot environments, heat stress can be a serious problem. The core body temperature for a human must be maintained within a very narrow range, regardless of work load or adverse environmental conditions. An increase in core body temperature of 1.4°C above normal can result in death. The body initially responds to heat by sweating and by circulating blood closer to the skin's surface to lower the main body temperature. When exposure to heat takes place over an extended period, a process of physiological adaptation called acclimatization occurs. Acclimatization may take weeks, although significant adaptation occurs within a few days of the first exposure. Once acclimatization is achieved, working in the heat results in increased production of a more diluted sweat and less of an increase in heart rate and body temperature.

Heat-related disorders

High temperatures, high humidity, sunlight, and heavy workloads increase the likelihood of heat stress. Too much heat can also make workers lose their concentration or become fatigued or irritable and therefore increases the chance of accidents and injuries. Understanding how to deal with heat stress can help to prevent or reduce accidents and is important to workers' health and well-being.

Heat rash

Is an early sign of potential heat stress. It is commonly associated with hot, humid conditions in which skin and clothing remain damp due to unevaporated sweat. Heat rash can result in small areas of the skin or the entire torso being affected. Even after the affected area of skin is healed, sweat production will not return to normal for another 4 to 6 weeks. Treatments include cleaning the affected area and applying mild lotions to it. Keeping the skin clean and dry for at least 12 hours each day will prevent severe heat rash.
**Heat syncope (partial or complete loss of consciousness)**

Is characterised by dizziness or fainting while standing still in the heat for an extended period. Heat syncope is the least serious of heat-induced disorders. Its most serious aspect is that it may cause people to fall or injure themselves while operating machinery.

**Heat cramps**

Symptoms include painful cramps or spasms in the legs, arms, or abdomen. The victim will probably sweat heavily. Spasms may occur during work or in the evening after work. Heat cramps are often caused by a temporary fluid and salt imbalance during hard physical work in hot environments.

**Heat exhaustion**

Heat exhaustion results from the reduction of body water content or blood volume. The condition occurs when the amount of water lost as sweat, exceeds the volume of water drunk during the heat exposure. The victim of heat exhaustion may have some or all of these signs or symptoms: heavy sweating; clammy, flushed, or pale skin; weakness; dizziness; nausea; rapid and shallow breathing; headache; vomiting; or fainting.

**First aid treatment**

First-aid treatment for heat exhaustion consists of:

- Move the victims to a cool area
- Place them on their backs with their feet raised
- Loosen clothing and apply cool, moist cloths to the body, or fan the victim
- Slowly administer sips of salt water (plain water for those with heart or blood pressure problems)
- Seek medical attention promptly, especially if victims faint or vomit

**Heat stroke**

Is a life-threatening, heat-related disorder associated with working under very hot and humid conditions. Heat stroke can result in coma or death. The early signs and symptoms of heat stroke include:

- A high body temperature, 40ºC or over
- Hot, dry skin that appears bluish or red
- Absence of sweat in 50 to 75 percent of victims
- Rapid heart rate
- Dizziness, shivering, nausea, irritability, and severe headache progressing to mental confusion, convulsions, and unconsciousness

A worker who becomes irrational, confused or collapses on the job should be considered a heat stroke victim, and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is important.
First-aid treatment for heat stroke consists of:

- Call for an ambulance
- Move the victim to a cooler environment and remove outer clothing
- Wet the skin with water, and fan vigorously or repeatedly. Apply cold packs or immerse the victim in a tub of cool (not ice) water. If no water is available, fanning will help promote cooling.

Preventing heat stress

- Acclimatisation (to heat) is a process of adaptation that involves a stepwise adjustment to heat over a week or sometimes longer. An acceptable schedule for achieving acclimatisation is to limit occupational heat exposure to one-third of the work day during the first and second days, one-half of the workday during the third and fourth days, and two-thirds of the workday during the fifth and sixth days. The acclimatisation procedure must be repeated after days off due to illness or a vacation of one week or more. To achieve acclimatisation, a person must work in the heat at the activity level required by the job.

- Always drink plenty of water when in the heat. Simply relying on feeling thirsty will not ensure adequate hydration. To replace the four to eight quarts of sweat that may be produced in hot environments, people require one-half to one cup of water every 20 minutes of the workday. Water at 12.8 ºC is preferable to ice water or warm water. Limit exposure time.

- Schedule as many hot activities as practical for the coolest part of the day (early morning or late afternoon).

- Employ additional help or increase mechanical assistance if possible.

- Minimise heat exposure by taking advantage of natural or mechanical ventilation (increased air velocities up to 5 mph increase the rate of evaporation and thus the rate of heat loss from the body) and heat shields when applicable.

- Take rest breaks at frequent, regular intervals, preferably in a cool environment sheltered from direct sunlight. Anyone experiencing extreme heat discomfort should rest immediately.

- Wear clothing that is permeable to air and loose fitting. Generally less clothing is desirable in hot environments, except when a person is standing next to a radiant heat source. Then covering exposed skin is beneficial to reducing heat stress.

Safety in the office

An office or study is not normally considered a hazardous area, but there are several factors concerning the office as a workplace which deserve attention.

Housekeeping

Keeping an area neat and tidy. Floors, particularly access ways should be kept free of clutter to prevent accidental tripping. Electrical cords should be taped to the floor if traversing a traffic area is unavoidable. Circuit breaker protected power boards
should be used for multiple connections to a power point. Any frayed electrical cords or malfunctioning equipment should be reported to the School Manager as soon as possible. All personal heaters and fans must be checked by Office of Facilities Management electricians and fitted with 1 hour timers.

**Occupational Overuse Syndrome (OOS)**

OOS, formerly known as RSI, is an injury thought to be caused by over-stressing certain soft tissue components of the body. OOS can affect workers in many different occupations, particularly those involving repetitive movement, and is not restricted to keyboard operators.

The UWA Senior Occupational Therapist can be contacted to assist you with Office Safety, especially ergonomics and workstation setup.

Many factors other than repetition and strain may be involved in OOS. These include posture, physiological stress, pre-existing injury or illness, work patterns and routines. Examples of "pause exercises" developed to prevent overuse injury are given in the Safety and Health Office website [http://www.safety.uwa.edu.au/policies/ergonomics](http://www.safety.uwa.edu.au/policies/ergonomics)

The Safety and Health Office provide an ergonomic advisory service. Individual and general work areas can be reviewed on request.
Manual Handling

About one-third of non-fatal industrial accidents in Western Australia are caused by incorrect lifting techniques. However little or much you lift, you still need to become aware of how to prevent back injury or hernia. Correct lifting takes practice. Here are a few tips to prevent problems –

1. Size up your load first - do you really need to lift it, or can you use a trolley or other aid?. Get help if you need it.
2. Bend your knees - keep back straight (not vertical).
3. Hold the load firmly - using the palms of your hands as well as fingers.
4. Lift by using leg muscles and body weight - dump the load as soon as possible, but DO NOT FORGET that putting the load down is just as important as picking it up.....Bend your knees !

There are safety and health office pamphlets available on the following items:

- identifying and eliminating discomfort
- checking your furniture
- assessing your posture
- organising your desk
- placement of your screen and document
- using a keyboard and mouse
- diagrams showing basic stretches.

For details see the University Manual Handling policy at:
http://www.safety.uwa.edu.au/policies/../policies/manual_handling

Using the School Boat and Diving

If you intend to utilise the School boat, you must have completed a boat handler’s course. If you intend to dive, as a student or staff member, using the School equipment, you must have a current and adequate divers licence and a current medical certificate. You must also have read the dive regulations found at
http://www.safety.uwa.edu.au/policies/underwater_diving_procedures

An oxy-viva kit is available for loan and must be taken when going on diving trips, but it must be cleaned off thoroughly with fresh water, dried and returned after every trip so it can be kept in good condition.

Further information is available from the School Boating and Diving Officer.

Costs

Costs for vehicle hire can be obtained at the booking points for the vehicles, and from the Boating and Diving Officer for the boat costs.
Towing limits and Load capacities

When using the vehicles to transport loads, please be aware of the loading capacity and the towing limits. This information can be found on the vehicle booking system, or speak to the Purchasing Officer ext 2542.
Equipment and Facilities

Plant Biology Analytical Facility/Laboratory

The Analytical Facility in the School is managed by Greg Cawthray and is located in Lab 2.22 of the Botany building. Contact Greg (gcawthra@plants.uwa.edu.au) ext 1789, for details and training to enable use of the facility.

Analytical equipment housed within the facility include:

- Gas Chromatography with Flame Ionisation Detection (GC-FID)
- Gas Chromatography with Mass Spectrometry Detection (GC-MS)
- High Pressure Liquid Chromatography (HPLC*3)
- UV/Vis Spectrophotmeter
- Liquid Scintillation Counter

Undergraduate Teaching Laboratories

Anyone who wishes to use the Undergraduate teaching laboratories must first obtain permission from the Laboratory Technicians, Hai Ngo in the Botany building (ext 3598 hai@cyllene.uwa.edu.au) and Elizabeth Halladin in the Soil Science building (ext 2573 elzbieta@cyllene.uwa.edu.au).

There are to be no chemicals left in any of the teaching labs. If you are working in one of the teaching labs, you must take the chemicals out when you are about to leave and store them in the appropriate cabinets or shelving.

Background Information.

1. Staff and students can use the teaching laboratories at any time, with the permission of the laboratory staff and providing this doesn’t clash with practical classes. This may necessitate vacating the laboratory by a set time to enable staff to set up practical classes. Keys are available for after-hours use (deposit required).

2. Students with laboratory staff permission can use all teaching laboratory equipment, however equipment is NOT to be removed from the labs (this includes glass/plastic ware).

3. If equipment is damaged it should be immediately reported to the laboratory staff so replacement can be arranged from the appropriate Group.

4. Consumable items and chemicals should be obtained from the student’s own Group i.e. their supervisor’s affiliate teaching Group. The teaching laboratories will only supply consumables and chemicals if the Group has already ordered a replacement and there are no delays affecting its arrival.

5. Users of the student labs are responsible for cleaning their laboratory space and any equipment after use or when directed by the laboratory staff. A wash up area is available in the laboratories (please consult laboratory staff for availability).

6. At NO time are the teaching laboratories to be used as a storeroom (for samples etc).
7. Proper health and safety procedures eg covered footwear, lab coat, chemical handling and scientific methodologies must be followed at all times while in the teaching laboratories. Laboratory staff must be contacted before the disposal of chemicals and experimental material.

8. Laboratory staff are available most of the time for any assistance with experimental methodology.

9. Students must understand that the priority of the teaching laboratories is teaching, ie undergraduate practical classes.

10. Field equipment borrowed from the teaching laboratories is to be returned and in clean working order.

**Plant Growth Facility (PGF)**

**Contacts**
PGF staff
Office: Northern End of Combined Workshop
Telephone: (08) 6488 8549
Email: pgf@cyllene.uwa.edu.au
Emergencies: 6488 2222 (24 hours)
Security: 6488 3020 or 6488 2222

**Location**
The Plant Growth Facilities complex is situated west of the combined workshop and adjacent to the taxonomic garden.

**Hours of operation**
The PGF complex is open from 8.30 am to 4.15 pm Monday to Friday. An after-hours key is accessible from the main building.

**Visitors**
Access to the PGF complex is limited to authorised personnel. Visitors must be accompanied at all times. Children must be under adult supervision and may not enter the plant growth facilities at any time.

Contractors who have been inducted under the University’s safety and health guidelines may be left unattended within the facility.

**Occupational Health and Safety Guidelines**
The plant growth facilities are considered as laboratories and proper lab safety guidelines should be followed at all times. Guidelines on safety policies, contacts, training, Material Safety Data Sheets and emergency procedures are available from the Safety and Health Office web page (http://www.safety.uwa.edu.au)

All people charged with the management of others are responsible for the maintenance of the safety and health standards for all operations and people under their supervision. Staff, students and contractors must recognize their individual and
joint responsibilities and cooperate ensuring that the highest possible safety and health standards are maintained when undertaking University activities.

**Basic standards to be maintained:**
- Follow health and safety guidelines
- Fully enclosed footwear is to be worn while working in the complex.
- No after-hours work is to be conducted alone.
- Wear appropriate sunglasses/sunscreen if working in exposed conditions and particularly whilst working under high intensity discharge lighting.
- Ensure necessary personal protective clothing and equipment is worn.
- Take good care of equipment.
- Report all hazards to the PGF staff.
- Report all injuries to the PGF staff.
- Do not work with open containers of flammable or volatile materials (i.e. solvents) in enclosed areas without adequate ventilation. This also applies to using compressed gases eg carbon dioxide.
- No pesticides or hazardous materials are to be applied or stored in the glasshouses without permission from the PGF staff.
- Smoking is prohibited in all areas of the complex. Smokers are asked to thoroughly wash their hands after smoking to minimize disease spread.
- Please do not hesitate to contact the PGF staff if you need assistance or have any questions about operating within the Plant Growth Facilities.

**Pesticide Applications**
- Pest and disease control is conducted in conjunction with the PGF staff, and is required for the effective operation of the facility.
- Please inform staff at the first sign of any pest or disease infection.
- Entry into glasshouses is prohibited following pesticide application. Notification on the front door will advise on re-entry for non-contact or contact of plants.
- Individuals may be asked to apply required pesticides with a scheduling of S5, however all S6 and S7 pesticides not for research use will be applied by trained and equipped technical staff.
- Information on pesticides used and application rates is recorded by PGF staff and is available upon request.

**Use of Potting Mixtures**
Composts, potting mixes and other organic gardening materials

These products are made from organic materials and contain living micro-organisms including bacteria, fungi and protozoa. They may also contain mineral and fertilizer additives.
Risk
Inhalation of dust and/or liquid mists may irritate, inflame or sensitize the nose, throat and lungs resulting in illnesses ranging from hayfever or asthma to pneumonia (e.g. Legionnaires disease) or pneumonia–like illnesses. Direct contact with this material or its dust and/or liquid mists (bioaerosols) may cause skin irritation (dermatitis) and skin or eye infection or irritation. People particularly at risk are those suffering from asthma or allergies and those whose immune defence systems are compromised.

Safety
Avoid contact with eyes and skin. Avoid breathing dust and/or liquid mists (bioaerosols). Wear suitable protective clothing and standard duty gloves (AS/NZS 2161). If exposed to dust and/or liquid mists, also wear dust resistant eye protection (AS/NZS 1336) and a particulate respirator (AS/NZS 1715 and 1716). Wash hands thoroughly immediately after handling. Wash work clothes regularly. Clean up by wet sweeping or vacuuming.

First aid
Irrigate eyes with plenty of water for 10 minutes. Wash skin with soap and water. Seek medical attention for any persistent skin, eye or respiratory symptoms.

Disposal
Follow above safety precautions and collect in containers for disposal as trade waste. For assistance or further details, speak with the PGF staff.

Transport and storage of items.
Trolleys are available from the western end of glasshouse B2. These are to be used for transport and not for storage of materials. Trolleys are to be returned promptly, cleaned and in good order. Use tips below as a guideline to lifting on and off your trolley.
For larger loads please discuss your needs with the PGF staff, as a loader is also available and forklifts can be hired from other sections of the University.
There are electric trolleys and a pot-lifting gantry available for use, please see PGF staff.

Tips on Lifting
- Assess your load and use a trolley or ask the facility staff for help if required.
- Bend your knees and maintain a neutral spine position.
- Hold the load firmly using the palms of your hands and fingers, and keep it close to your body.
- Lift and place load by using your leg muscles and body weight: avoid twisting.
- When loading trolleys or benches try to slide the load along the surface as much as possible.
- Limit the amount of twisting you do when transferring items from trolleys to bench and vice versa
Field Station

Contacts

Michael Blair (phone: 9387 3384, mobile: 0419 930 407, mblair@cyllene.uwa.edu.au) is the Field Station Manager and the primary point of contact for all field station needs.

Visitors

All visitors to the Field Station research facility MUST sign in and sign out at the finish of the visit as required by the Facilities Manager and also for safety and security reasons. The sign-in book is located in the entrance to the Eastern Laboratory.

Background Information

1. The UWA Shenton Park Field Station is located 7 km from the main campus at 1 Underwood Ave, Shenton Park.

   It has the following facilities:

   • 13 Screenhouses (6 of which are for general purpose and not allocated to any particular group)
   • 1 General purpose glasshouse, with 6 x 1.5m x 3.0m and 2 x 1.5m x 5 m benches
   • 1 Quarantine glasshouse
   • 3.75 hectares of netted irrigated land
   • 2.5 hectares of non-netted irrigated land
   • 1 PC2 rated polycarbonate plant house. With 3 modules and one module allocated to Grain Biotech Australia. A soil sterilisation area, and a service area for pots and other supplies
   • 1 Threshing shed. 6 Bays with dust extraction, compressed air, workbenches and air conditioning
   • 5 Drying ovens (1 is a little user-group specific). 4 run to approx. 50 degrees C. The new one will run to 120 degrees.
   • Seed labs: Large amount of bench space and work areas
   • Shared labs: for the occasional users of the Field Station (eg. Honours students or PhD students)
   • Empty Labs
   • Agricultural Machinery:
     - Two Tractors
     - Articulated Front End Loader
     - Hi-Lux 4WD Tray-Back Ute
     - Rotary Hoes
     - Slashers
Hand tools
Horticultural equipment
Boom spray
Hand spray

To use any of this equipment yourself you will have to demonstrate competent and confident operation of the machinery. If you are unsure how to use this equipment, please ask the technician for help.

2. If visiting the Field Station for the first time, you must contact Michael Blair to organise an induction of the facility, including safety induction.

If you require after-hour access to the Field Station please arrange for access to the gate and front door if using the labs. If you intend to enter the laboratory areas after-hours you will have to be issued with a PIN number for the security system. Michael Blair is able to issue you with both the keys and the PIN number.

**Combined Workshop Facilities**

**Location**
Location - Just south of the Biology building and north of car park 9

**Contacts**
In the first instance - The workshop technician in charge: Ray Scott Ext. 2570

**Hours of Operation**
The Workshop Complex is open Monday to Friday, 8.00 am to 4.00 pm.

**Facilities Available**

1. **Machining**
   - metals (all types)
   - plastics (all types)

2. **Fabrication**
   - wood work
   - steel work
   - plastics
   - sheet metal

3. **Electronics**
   - minor repairs

4. **Design and Development, all areas.**

Students requesting work to be carried out by the workshop should -

- Have authorisation from their supervisor
- Fill in the appropriate work order sheet supplied by the workshop
• Be prepared for a delay before work can commence on their job.

The Workshop operates on the following priority listing –

• Construction and repair of equipment for undergraduate student practical classes.
• Repair of equipment for undergraduate projects
• General repair and maintenance of Faculty equipment. Note - Repairs to furniture should be directed to Property Services.
• Construction of equipment or parts of equipment for staff and postgraduate projects that are not available commercially.
• Construction of equipment that is available commercially.

Occasionally there is room for flexibility within these guidelines (at the discretion of the Workshop Technician), however it would be appreciated if these priorities could be kept in mind when placing orders.

Workshop Safety Procedures that WILL be adhered to -

• Footwear - only suitable footwear will be permitted in the workshop. NO bare feet or thongs.
• No unauthorised use of any machinery in the workshop.
• No unauthorised movement through the workshop.
• Workshop equipment is not available for loan under any circumstances.
• Any work of a private nature will not be done in the workshop.

Inspection of Redundant Equipment
Prior to the disposal of any old or broken equipment, please notify the Workshop Technician. This affords the workshop staff an opportunity to inspect the equipment and strip any component parts for use in other jobs.

Gas cylinders
All gas cylinders in the School need to be secured INDIVIDUALLY to a solid fixed location, using a chain that will not burn or melt during a fire. If cylinders are not fixed in this fashion, they will be removed from your work area. When moving gas cylinders only use a trolley that is specifically designed for the job. It can usually be found in the gas lab on the walkway on the ground floor of the Botany building. Please return it after use. This applies to all cylinders, whether full, in use, empty or dive cylinders.

Cylinders of compressed gas must be turned off at the cylinder valve when not in use.

Precautions for specific gases:

<table>
<thead>
<tr>
<th>Gas</th>
<th>Precautions</th>
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<tbody>
<tr>
<td>Oxygen</td>
<td>Do not use grease/oil on oxygen cylinders or pipe work</td>
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<tr>
<td></td>
<td>Do not use as a substitute for compressed air.</td>
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<tr>
<td>Acetylene</td>
<td>Use only approved regulating valves</td>
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<tr>
<td></td>
<td>Avoid pipe fittings containing 65% or more copper</td>
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<tr>
<td>Gas</td>
<td>Properties</td>
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<tr>
<td>Nitrous Oxide</td>
<td>Similar to those of oxygen</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>Explosive range in air 4%-75% hydrogen V/V</td>
</tr>
<tr>
<td>Acetylene</td>
<td>Explosive range of acetylene in air 2%-82% acetylene V/V</td>
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NEVER store hydrogen and acetylene cylinders inside a laboratory. These cylinders MUST be stored outside at all times. In addition, hydrogen cylinders must be stored at least 1 metre from compressed air cylinders to reduce the risk of explosion.

**Borrowing Equipment**

If you wish to borrow equipment from anywhere in the School, please obtain the permission of the person responsible for that area before you take the item.

If you are taking anything form the Botany Teaching store room on the ground floor, please fill in the borrowers book located on the gate to the caged area. Please be aware that the equipment in that area is there for teaching requirements, and could be recalled from the borrowers at any time if it is required for teaching labs. The person to contact for equipment in the Botany teaching laboratories is Hai Ngo (hai@plants.uwa.edu.au ext 3598).

**Using New Equipment**

If you are using equipment you have not used before, please obtain full instructions before you attempt to use it. Failure to do so may lead to personal injury and damage to the equipment.