**HEALTH AND SAFETY MANUAL**

General Statement on Health and Safety Management

Plant Biology fully endorses the Work Health and Safety Policy of the University of Western Australia. This health and safety manual supplements the central policy to provide and maintain healthy and safe working conditions, equipment and systems of work. We shall, so far as is reasonably practicable, ensure that no persons are put at risk from activities carried out under the auspices of the University.

Allocation of resources, information, instruction, training and supervision shall be provided as necessary to achieve this.

This manual and its associated systems of work shall be kept up to date to take account of changes in local activities and to promote a process of continuous improvement and full compliance with relevant health and safety and related legislation.

Operational health and safety management shall be continually monitored and reviewed at least quarterly by a Health and Safety Committee chaired by a member of senior management.

Reporting processes shall be developed and maintained to ensure that relevant information is made available to the local Health and Safety Committee.

A copy of this statement and manual shall be made publically available via Plant Biology website.

**Endorsed by:**

|  |  |  |
| --- | --- | --- |
| Print Name: | Signature: | Date: |

**Dean / Director**

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# PURPOSE

Persons who conduct a business or undertaking have the primary duty to ensure the health and safety of workers and other persons at the workplace. This requires the person to ensure that risks are eliminated so far as is reasonably practicable. If it is not possible to eliminate the hazard then minimise the risks as far as is reasonably practicable. This manual has been prepared to provide procedural guidance relating to the management of health and safety. It contains information which describes a framework for developing safe working practices and operation of a safe system of work. It also reminds workers of their personal responsibility to follow health and safety guidelines and to maintain an active safety awareness at all times.

# SCOPE

The contents of this health and safety manual apply to all persons who are authorised to carry out activities in the area to which it applies under the auspices of the University of Western Australia. They are required to work in accordance with this manual and any associated system of working. Confirmation of receipt and understanding of the contents of this manual must be recorded.

# INTRODUCTION

Successful management of health and safety can only be effectively achieved when the participation of workers at all levels is built into all its processes for identifying and controlling risk. Everyone has a responsibility to co-operate with their colleagues to achieve a safe and healthy workplace, and to take reasonable care of themselves and others.

Safety management can be considered as a step-wise process which builds a framework which encompasses all activities carried out in the workplace and which promotes self-checking, review and continual improvement. It addresses the safety management in the workplace, the use of resources and carrying out individual activities.

In the management of health and safety there are defined roles of nominated individuals. They assist the senior manager; help to resolve health and safety issues and also report to the local Health and Safety Committee. Definitions of these roles can be accessed via the RESPONSIBILITIES section of this manual.

# DEFINITION OF TERMS

Resources

People, equipment and substances used within the workplace.

Demonstrable competency

In some circumstances it is not possible or is difficult to verify formal qualifications, particularly when they were obtained many years previously. Workers must have received appropriate information, induction, instructions and training, be fit for duty and be deemed competent to safely carry out the task. Demonstrated knowledge, skills, ability and experience can all be collectively considered as an alternative assessment of competency but that assessment must be recorded and filed for reference.

**Standard Operating Procedure (SOP)**

This is a document which helps to minimise risk by identifying hazards, providing guidance for use and recording user competency regarding the operation of potentially hazardous equipment. It includes pre-operational checks, guidance for use, post-use guidance and forbidden uses.

**Method Statement**

This document contains the instructions for carrying out the job. It breaks the task down into discrete steps and includes who is responsible for each (i.e. operator, supervisor, manager). This document can account for safety aspects of the work by incorporating any control measures which have been identified in risk assessments. It can also be used independently as a stepwise instruction sheet to carrying out both one-off and routine tasks.

**MSDS**

Material Safety Data Sheet is an information sheet on the properties and hazards associated with chemical substances used in the workplace that contains essential information in the safe handling and storage of substances.

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. A copy of the most recent MSDS can be requested from the vendor at the time of ordering the chemical.

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 also be found at the ChemAlert program at the Safety and Health Office web page: <http://www.safety.uwa.edu.au/page/8722>

Hazardous substances

This includes chemicals which could be corrosive, known carcinogens or toxic. It also includes pathogens, solvents, gases and others. The MSDs for a substance will detail if it is listed as being hazardous &/or dangerous. For further information regarding hazardous substances contact UWA Safety, Health and Wellbeing.

**Noise Treatment Plan**

A report that indicates areas around equipment and processes that exceed noise exposure levels and sets out a treatment plan to reduce noise by the implementation of engineering controls or the mandatory wearing of hearing protection.

# LEGAL REQUIREMENTS AND IMPLICATIONS

A system of working which reflects the legal requirements placed on the University and simultaneously provides documentary evidence of compliance is a vital component of a Safe System of Work.

Day to day monitoring of compliance is the responsibility of all those with managerial responsibility. Managers and the local Health and Safety Committee should also use reports of injury, near misses and sickness linked to work to determine whether existing arrangements require modification in order to minimise recurrence. The effectiveness of local safety management should be co-ordinated via the Health and Safety Committee which calls for and reports on the outcome of regular inspections or self-auditing.

Refer to <http://www.safety.uwa.edu.au/management/monitoring>

## Legislation

### Work Health and Safety Act 2013

This is the principal legislation to which this manual relates. This legislation places higher level responsibilities upon certain individuals, particularly Officers. It refers to non-transferable work health and safety duties related to specific roles and standards of care associated with all activities conducted within a workplace.

A person can have more than one duty and more than one person can have the same duty. Under these circumstances, each person must discharge the duty to the extent that they have the capacity to influence and control the matter. Duties imposed on a person to ensure health or safety requires the person to eliminate risks to health and safety, so far as is reasonably practicable, and if it is not reasonably practicable to eliminate, then to minimise those risks so far as is reasonably practicable.

### AS/NZS 4801: OHS Management System - Specification with Guidance for Use

This provides guidance through which the University seeks to:

1. Implement, maintain and improve its Occupational Health and Safety Management System (OHSMS)
2. Assure itself of its conformance with its stated Occupational Health and Safety policy.
3. Demonstrate such conformance to others.
4. Obtain certification of its OHSMS by an external organisation.
5. Make a self-declaration of conformance with the Standard.

### ISO31000: Risk Management Standard

This was used as a reference for guidance in the development of the UWA approach to safety management of hazards through the assessment and control of risk.

## Record Keeping

Adequate record keeping is essential because the absence of such records could be regarded as not having fulfilled the required duty of care. Records also provide the means by which it is possible to demonstrate due diligence. Evidence of review, operation of local Health and Safety Committees and involvement by those responsible for directing work and activities are key factors in determining that a safety management system is pro-active, responsive and up-to-date.

The University uses AS/NZS 4801 OHSMS Standard as its means of planning, conducting and monitoring safety performance in all areas.

Key documents required for examination by auditors are:

### The UWA Safety and Health Risk Register: Refer to [www.safety.uwa.edu.au/safety\_management](http://www.safety.uwa.edu.au/safety_management) page and see ‘UWA Safety and Health Risk Register’ \*

### This Health and Safety Manual: This manual shall be the principal reference for safety management in the workplace. \*

### Standard Operating Procedures: Combined safety assessments and training record documents describing the safe use of hazardous equipment. \*

### Evidence of competency and training: Either by qualification or by experience and well established demonstrated knowledge that individuals are able to use resources and conduct work safely. Evidence of safety induction for all workers must be recorded. \*

### A prescribed process for the planning of tasks and activities: A documented process for planning of otherwise unassessed activities which may be such as to require documented description and specific risk assessment via a standardised process. \*\*

### Evidence of use of monitoring: This includes area safety inspection checklists, self-auditing and/or intra-University auditing to the adopted AS/NZS 4801 standard. \*\*

### Evidence of regular review: This includes health and safety committee meetings, reporting and implementation of improvements and an annual (or more regular if required) review of this Health and Safety Manual. \*\*

\* Assistance can be accessed via the UWA Safety, Health and Wellbeing website by provision of pro-forma documents.

\*\* Sections of this manual are dedicated to these items

# RESPONSIBILITIES

Details of health and safety responsibilities for Deans, Heads of Schools, Directors of Centres or Sections, Supervisors, Health and Safety Representatives, School Safety Officers, Building Wardens, First Aid Officers, employees, students, contractors and visitors are available via the UWA Safety, Health and Wellbeing website. Refer to <http://www.safety.uwa.edu.au/policies/responsibility_and_accountability>

|  |  |
| --- | --- |
| Heads of School | 1. Ensure familiarity with key hazards and risks in your workplaces and key processes for controlling them.
2. Ensure that management processes, which comply with the UWA Work Health and Safety Policy, are implemented throughout workplaces under your control.
3. Demonstrate active and visible leadership through effective consultation and coordination to achieve strategic objectives.
4. Provide governance to achieve objectives for monitoring and reporting processes and interpretation of outcomes to initiate appropriate responses.
5. Check that reporting of injuries, incidents, near misses and hazards is timely and that appropriate investigations and conclusion are conducted.
6. Check that where monitoring processes identify deficiencies, appropriate action is undertaken to enable allocation of resources to stimulate improvement and work towards compliance.
7. Ensure that the necessary safety personnel are appointed and that their activities will be supported.
8. Receive feedback from your workplace health and safety committee to maintain an overview of the current status in your workplaces.
9. Ensure that all managers and supervisors understand work health and safety requirements and expectations to the extent that they can pass on relevant information, identify training needs and provide appropriate supervision in their workplace.
 |
| School Manager | 1. Ensure that workers understand work health and safety requirements and expectations through provision of relevant WHS induction, information, instruction, training and supervision.
2. Ensure that hazards and areas of risk which can be proactively controlled are properly addressed. Controls may include competency based training and adoption of UWA Safe System of Work processes.
3. Actively stimulate the local workplace safety culture by promoting discussion and integration of health and safety considerations into the planning of all tasks and activities undertaken.
4. Ensure continuous improvement through self-examination of progress towards health and safety objectives and by external review via University monitoring and reporting processes.
5. Take a direct and personal interest in reported injuries, incidents, near misses and hazards to ensure that appropriate reporting, investigation and response is being achieved.
6. Use reported outcomes of monitoring process to allocate resources to correct identified deficiencies and work towards achieving legislative compliance.
7. Encourage and enable safety personnel to fulfil appointed duties including representing workers, attending meetings, attending training and engagement in forums where pro-active planning and resolution of health and safety issues may be achieved.
8. Ensure that the workplace health and safety committee is used as the focal point for monitoring, reporting and coordination of local health and safety management.
9. Ensure a personal understanding of work health and safety requirements and University expectations and promote compliance in all forums where planning and operational management occurs.
10. Ensure worker health and safety in areas of known risks by delegating the checking of proposed activities to subject experts and evaluating their opinion before granting permission to proceed.
11. Promptly address work health and safety issues that are brought to your attention in consultation with those involved or affected and ensure that supervisors and other workers understand the health and safety issue resolution process and that it is used transparently and without prejudice.
 |
| Supervisors | 1. Familiarise yourself with and take responsibility for development of, procedures and practices which are applicable to the workplace you supervise.
2. Ensure you are familiar with control of hazards from resources in your workplace and identify training needs to ensure optimum worker competency.
3. Promote discussion, toolbox talks and consideration of work health and safety aspects of planned tasks and activities.
4. Engage with and embrace monitoring processes as a valuable tool to assist and enhance your perspective of the current status of work health and safety.
5. Ensure that workers report injuries, incidents, near misses and hazards promptly and in accordance with the prescribed procedures of UWA Safety, Health and Wellbeing.
6. Apply allocated resources appropriately to strengthen and enhance work health and safety practices wherever applicable.
7. Consult and cooperate with appointed safety personnel to enable them to fulfil the duties of their role.
8. Make use of the Health and Safety Committee and Health and Safety Representatives to engage and consult regarding work health and safety matters.
9. Apply your understanding of work health and safety and reinforce its most relevant messages in your workplace in all communication with workers.
10. Engage with assessment of proposed tasks and activities which are planned for your workplace to ensure personal understanding and also to provide the benefit of your close personal knowledge of local working conditions and constraints.
11. Investigate incidents, seeking to thoroughly identify the contributing factors, absent or failed defences and improvements required in order to prevent recurrence.
12. Co-operate fully in the rehabilitation of injured employees.
13. Ensure that all workers are familiar with emergency and evacuation procedures and the location of first aid kits, personnel and emergency equipment, and if appropriately trained, the use of emergency equipment.
14. Ensure that you understand the resolution of issues process and ensure that workers are aware of it and can use it as needed.
15. Refer work health and safety issues that are beyond your control to the relevant manager(s) for their attention, but ensure that interim action is taken to reduce the risks in a practical way.
 |
| Health and Safety Representatives | 1. To inspect the workplace or any part of it at such times as agreed with the Faculty/Department/Centre/Section heads
2. 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 heath of any person to carry out any appropriate investigation in respect of the matter
3. To keep informed on the health and safety information provided by the University in accordance with work health and safety legislation
4. 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
5. To refer any matters that they believe should be considered by the local health and safety committee or the University Safety Committee
6. 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 | 1. Assisting with a management systems approach to safety and health within the School / Centre /Section
2. Assisting with the appointment of safety personnel and ensuring they understand and fulfil their responsibilities
3. Co-ordinating their activities with those of other safety personnel such as Health and Safety Representatives, First Aid Officers, Building Wardens, Wardens and designated Safety Officers (including Biological, Chemical, Fieldwork, Radiation)
4. Conducting or co-ordinating regular internal safety inspections
5. Discussing potentially hazardous processes and operations with staff, students and visitors and obtaining their co-operation in reducing them as much as possible
6. 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)
7. 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
8. Periodically inspecting hazard, incident and injury reports, investigating where appropriate, and taking appropriate action to achieve safe working and prevent recurrences
9. Recommending to the Head of School any changes to avoid hazards (the responsibility for implementing such recommendation rests with the Head of School)
10. Informing others of possible hazards by distribution and circulation of safety information and by appropriate publicity such as circulars or posters.
 |
| 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 lifesaving techniques such as expired air resuscitation and cardio-pulmonary stimulation. First Aid Officers are required to be familiar with the specific hazards and conditions of their workplace. |
| Employees / students & School Visitors  | 1. Complete the UWA online health and safety induction and also workplace specific inductions.
2. Familiarise yourself with the UWA Work Health and Safety Policy and work health and safety requirements which are applicable to your area of work.
3. Always take reasonable care for your own health and safety and that of others who may be affected by your acts or omissions.
4. When planning new or unfamiliar work and activities seek guidance from your supervisor to establish if proactive processes have already addressed potential hazards and whether there are outstanding risks which must be documented and assessed.
5. Ensure you follow standard industry hazard control processes, legislative requirements, relevant standards and codes of practice.
6. Cooperate with the University by following instruction from your supervisor to ensure compliance with work health and safety legislation.
7. Report to your supervisor all hazards, near-misses, incidents and injuries.
8. Participate in discussions and consultation on the management of work health and safety risks that may affect you.
9. Follow University policies, procedures and requirements with respect to work health and safety.
10. Wear appropriate clothing, footwear and protective equipment for the work being done and properly use relevant safety devices.
11. Do not wilfully place at risk the health, safety or wellbeing of others or misuse safety equipment.
12. Familiarise yourself with local and University wide emergency procedures and cooperate with directions from emergency wardens and other emergency personnel.
 |

## Duty of Care and Due Diligence

Responsibilities extend beyond minimum compliance with statutory obligations. Every individual owes a duty-of-care to each other person they encounter in their activities. Health and safety legislation places specific responsibilities on individuals including the requirements of due diligence as shown in the following table:

| **Duty holder** | **Responsibilities** |
| --- | --- |
| * A person conducting a business or undertaking:
 | * Must ensure, so far as is reasonably practicable, that workers and other persons are not put at risk from work carried out as part of the business or undertaking.
 |
| * Persons conducting a business or undertaking who:
 | * Must ensure, so far as is reasonably practicable, that:
 |
| * manage or control a workplace
 | * the workplace, including entry and exit and anything arising from the workplace are without risks to health and safety
 |
| * manage or control fixtures, fittings or plant at workplaces
 | * the fixtures, fittings or plant are without risks to health and safety
 |
| * design, manufacture, import, supply or install plant, substances or structures
 | * the plant, substance or structure is without risks to health and safety
 |
| Officers: | * Must exercise due diligence to ensure that the business or undertaking complies with the Work Health and Safety Act and Regulations. This includes taking reasonable steps to:
 |
| * acquire and keep up to date knowledge of work health and safety matters associated with the operations of the workplace
 |
| * ensure that the organisation has and uses appropriate resources and processes to eliminate or minimise risks to health and safety
* ensure appropriate processes for receiving and considering information on incidents, hazards and risks and responding in a timely way
* ensure that the organisation implementsprocesses for complying with any duty or obligation of the body under the Act (e.g. incident notification, consultation, notice compliance)
* verify the provision and use of resources
 |

## Health and Safety Committee

School Health and Safety Committees have an advisory and coordinating role for the management of local health and safety matters. Membership of Faculty Health and Safety Committees is expected to include a management and worker representative from each School Health and Safety Committee. This promotes good communication and ensures that matters which are unresolved at School level are referred upwards.

Efficient information feedback processes are the key to promotion of continual improvement (the most fundamental aspect of the AS/NZS 4801 Standard). Whilst managers play crucial roles in health and safety management, their involvement in regular meetings of the local Health and Safety Committee creates a formal and efficient forum for reporting and managing safety in the workplaces. It also assists in meeting their responsibilities as “Officers” by demonstrating due diligence (see RESPONSIBILITIES; Duty of Care and Due Diligence). All parts of the University are required to address health and safety matters through effective consultation and representation. A Health and Safety Representative or five or more workers may request the creation of a Health and Safety Committee. The workplace must respond by establishing the committee within two months of the request. The workplace may establish a Health and Safety Committee at any time on their own initiative. A member cannot be held liable in criminal or civil proceedings because of any acts, or omissions, done honestly and reasonably, pursuant to their role as a member of the committee.

* Refer to <http://www.safety.uwa.edu.au/management/committees> for further information relating to:

6.2.1 Structure and Representation

### 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

6.2.2 Terms of reference cont.

* Meetings and reporting schedule; the Plant Biology Safety committee meet every two months throughout the working year
* Pro-forma committee documents (agenda, minutes and annual report) can be found on the Plant Biology Web pages: <http://www.plants.uwa.edu.au/staff/safety_and_inductions/safety_committee>
* 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.

The flow of information between health and safety committee members and workers should be regular and timely. This demonstrates that the University is improving health and safety by addressing problems, which encourages workers to take an interest in their own health and safety and that of their colleagues. Minutes of meetings are to be distributed to all committee members and also to be made available to workers. Feedback meetings should be arranged to seek the views of workers affected by Health and Safety Committee decisions.

## Resolution of Health and Safety Issues

It is important to address health and safety issues as soon as possible to minimise the risk of harm from hazards. The University has Notification and investigation processes which are provided to ensure that health and safety matters are reported, investigated and resolved effectively. These processes follow sequential, escalating steps for resolution of issues. WorkSafe WA can be notified if there is a risk of imminent and serious harm. Where a worker has a health and safety issue or problem that needs to be resolved the following steps shall be followed.

* Report the matter to Supervisor of the affected workplace for resolution.
* If not resolved, where there is a workplace Health and Safety Representative, the Supervisor shall advise and consult with the Health and Safety Representative with a view to developing a strategy for resolving the issue. Otherwise the Safety Officer for the area should be consulted.
* If the issue remains unresolved then the workplace Health and Safety Representative or Safety Officer shall refer the issue to the Head of School or Manager of the School, Unit or Centre for resolution.
* If the issue remains unresolved the workplace Health and Safety Representative or Safety Officer shall refer the issue to UWA Safety, Health and Wellbeing for resolution.
* If the issue remains unresolved then UWA Safety, Health and Wellbeing shall refer the issue to the University Safety Committee for resolution.

Further information: [www.safety.uwa.edu.au/policies/resolving\_safety\_&\_health\_issues](http://www.safety.uwa.edu.au/policies/resolving_safety_%26_health_issues)

[www.safety.uwa.edu.au/incidents-injuries-emergency/notification](http://www.safety.uwa.edu.au/incidents-injuries-emergency/notification)

For further information regarding nomination, election and duration of position of employee Health and Safety Representatives contact UWA Safety, Health and Wellbeing for advice.

## Delegation of authority to endorse safety related documents

Safety Management documentation often requires endorsement by the Head of School, the Director or equivalent as the manager who has overall responsibility for all tasks or activities carried out in or under the auspices of their workplace. This often places them in a difficult position when asked to endorse various activities in so far as they are not necessarily best qualified or experienced to make expert judgement regarding the content of associated health and safety documentation including assessment of risks.

A practical solution to this situation is to delegate signatory authority to a competent third party allowing them to sign by proxy (p.p.) whilst the Head of School still retains overall responsibility. The third party must be sufficiently conversant with the particular activities to make critical assessments on an objective and informed basis. Delegation of signatory authority must be in written form, stored for reference and reviewed regularly (e.g. every two years).

Documents which are used to propose work and analyse safety aspects are sometimes forwarded, for endorsement, to a committee or group with specific subject expertise in accordance with legal requirements. Whether the delegated signatory authority is to an individual or to an expert committee or group, the Head of School still has overall responsibility for the task or activity with the delegate in the role of an advisory resource. Such arrangements must be formally recorded. For a more detailed examination of University policy on delegation of authority refer to:

Delegation definitions: <http://www.delegations.uwa.edu.au/procedures/definitions>

Bands of delegated authority: <http://www.delegations.uwa.edu.au/bands>

University delegations <http://www.delegations.uwa.edu.au/university_delegations>

 (Select ‘Head of School’ under bands 5a and 5b)

# SAFE CONDUCT

## Required standards of behaviour

The following requirements meet the required standards of behaviour for all personnel in the workplace:

* Particularly in potentially hazardous workplaces, never adopt a casual attitude, reckless behaviour or run in the area.
* Always be conscious of potential hazards.
* Ensure that personal clothing is suited to the working environment conditions, e.g. safety closed in footwear - bare feet, thongs and sandals are prohibited in the many workplaces including laboratories, workshops, kitchens and others. Similarly, complying with all uniform requirements will ensure that clothing is safe.
* Use, store and maintain any protective clothing, devices and Personal Protective Equipment (PPE) which is appropriate to the type of tasks or activities giving due consideration to other adjacent work being carried out in the vicinity.
* Always exercise care when opening and closing doors and entering or leaving the workplace.
* Only handle, store or consume food or drink in suitable areas. Kitchen areas are designated as such and there are restrictions which apply to some areas such as workshops or laboratories.
* Only store food or drink in refrigerators which are intended for that use.
* Particularly in potentially hazardous workplaces, regard all substances as potentially hazardous unless there is definite information to the contrary and take additional care when carrying or moving them.
* Work shall only be carried out with the permission of a Supervisor.
* Never undertake any work unless the potential hazards of the operation are known and appropriate safety control measures exist or have been implemented.
* Any flame producing activity is not to commence until the immediate area has been cleared of dusts as many materials, which are non-flammable in a lump state, become volatile when in powdered form or as dust.
* All safety equipment must be labelled and maintained in good working order in accordance with the manufacturer’s instructions.
* Report to the supervisor, any requirement for maintenance which may have been overlooked
* Keep all fire-escape routes completely clear at all times.
* Ensure that all safety equipment remains accessible to personnel at all times and never deposit items adjacently which could hinder easy access.
* Warning signs and barriers appropriate to the work being carried out are to be displayed at entrances to the workplace. If the work could be hazardous to other individuals then restricted access controls may be appropriate.
* Report incidents, injuries, near misses and hazards via the formal University reporting procedure [www.safety.uwa.edu.au/forms/incident](http://www.safety.uwa.edu.au/forms/incident)

## No smoking policy

The University is “smoke free”. Smoking is prohibited in, or at, all of the University’s buildings, properties and workplaces. The ban on smoking applies to staff, students, visitors and contractors. Under the University’s policy on smoking, the environment is to be free from tobacco advertising, promotion, sponsorship, sale, and both direct and indirect research funding from the tobacco industry. Accordingly, managers and supervisors shall promote and ensure compliance with the University policy on smoking. For further information refer to the UWA Safety, Health and Wellbeing website <http://www.safety.uwa.edu.au/health/uwa_is_smoke_free_2012>

## Electrical safety

Electrical equipment used on UWA property must be compliant and be visually inspected or electrically tested and tagged according to the electrical classification of the environment. Students and campus visitors are requested to have read and comply with the Electrical Safety Pamphlet which is located at <http://www.safety.uwa.edu.au/topics/electrical-safety>.

After the workplace has been determined as either electrically non-hostile or hostile, a regular inspection schedule can be developed. It is recommended that regular workplace safety inspections are synchronised with the checking periods which are required for electrical equipment.

### Non-hostile electrical environment

This is a workplace that is dry, clean, well-organised and free of operating conditions that may result in damage to electrical equipment or the flexible supply cord. In accordance with ‘Safe Work Australia: Code of Practice - Managing Electrical Risks in the Workplace’, electrical equipment used in electrically non-hostile operating environments does not require tagging. It is sufficient to visually inspect equipment and cords for damage prior to use and thereafter on a regular basis.

### Hostile electrical environment

This is a workplace where the equipment or appliance may be subjected to events or operating conditions which could result in damage to the equipment or a reduction in its expected lifespan. This includes but is not limited to physical abuse, exposure to moisture, heat, vibration, chemical damage and other harsh conditions where cables could be damaged. Visual Inspection tags are applied to new electrical equipment in hostile areas prior to its initial use (available from UWA Safety, Health and Wellbeing). Regular electrical testing and tagging, using coloured tags denoting the year of testing, must be carried out by an authorised competent person in accordance with AS/NZS 3760. Any white visual inspection tags are then removed. The UWA Electrical Equipment Test and Tag Unit Register are provided to assist in the location of the required resources.

Use the Workplace Safety Inspection Schedule wall poster to classify workplaces as either non-hostile or hostile electrical environments in accordance with the provisions of AS/NZS 3760. It assists in defining the type of tagging required, the retagging frequency (and testing frequency if required) and who is allowed to replace/apply tags. From this information, the required frequency of workplace inspections can be set to keep in step with the electrical tagging requirements (maximum period between inspections is 12 months). After each inspection, the dates on the lower part of the poster are to be adjusted before it is printed in colour and displayed in a prominent position in the area as a very visible, bright reminder of when the next inspection is due.

The electrical safety of laptop computers and other personal electrical equipment is the responsibility of those students, visitors and staff who bring them to UWA workplaces. Electrical leads are to be inspected for damage. Leads must not create a trip hazard. Personal electrical equipment may only be used with permission from workplace supervisors.

## Purchasing

All materials and equipment acquired by the workplace or by individuals for use at work, must comply with the standards, codes and regulations prescribed by law and by University requirements. Only those that can be safely accommodated and used within the workplace should be obtained. Individuals who arrange the purchase of material or equipment must obtain all necessary information to enable the associated risk to be assessed in order to maintain legal compliance. They must also comply with the requirements of the [purchasing procedures](http://www.safety.uwa.edu.au/management/purchasing). Only authorised signatories shall approve acquisitions. Details of authorised individuals are available from Financial Services.

## Visitors and contractors

Visitors or Contractors must report to a reception point at the workplace. The member of the workplace who the visitor or contractor wishes to see must be contacted and asked to attend and meet their visitor or contractor and accompany them in the workplace. In the case of restricted access worksites, the contractor may be granted permission to enter the area for the duration of the work unless any circumstances occur which affect the health and safety of other people in the area. The policy in relation to Visitor Safety is available via the UWA Safety, Health and Wellbeing website: [www.safety.uwa.edu.au/policies/visitor\_safety](http://www.safety.uwa.edu.au/policies/visitor_safety)

## Services and facilities

The planning and undertaking of building, alteration and repair work, and the installation and maintenance of plant and equipment, by persons from outside the University needs to be adequately controlled to ensure the health and safety of others people present in the workplace. The University has a health and safety policy for contractors, which requires that safety is managed through cooperation between the stakeholders. The University is responsible for all persons working on its property and must therefore verify that safety management is satisfactory.

## Children

If children are brought onto University premises they must be under the immediate and close supervision of a parent or guardian at all times. Children are NOT permitted in hazardous areas such as laboratories, workshops, kitchens or any other area where the person in charge considers it to be inappropriate. For further information regarding the Children in the Workplace, including rights and responsibilities of parents refer to the policy on [Children on the University Campus](http://www.universitypolicies.uwa.edu.au/search?method=document&id=UP07%2F7).

## Safety off University premises

Many activities take place off University premises, including field trips and supervision in isolated areas. Staff, students and others have a responsibility to identify foreseeable risks and take appropriate action. Activities such as field trips require adequate competent supervision, first aid equipment training, appropriate protective clothing, closed footwear, sufficient communications arrangements and availability of emergency equipment. Persons who are responsible for fieldwork shall familiarise themselves with the University guidelines. Staff who are responsible for the placement of students shall also familiarise themselves with the University guidelines on placement of students. For further information regarding field work in rural and remote areas refer to the UWA Safety, Health and Wellbeing website: [www.safety.uwa.edu.au/policies/field\_work](http://www.safety.uwa.edu.au/policies/field_work)

## Use of computer workstations

All workers must be aware of the hazards of repetitive work such as keyboard use or laboratory work and occupational overuse. Staff must take regular breaks and postural readjustments to avoid muscular strain, and report any symptoms to their supervisor. The UWA Safety, Health and Wellbeing team offers ergonomic assessments for all staff (including staff with ‘working from home’ arrangements) and these can be booked by contacting the UWA Safety, Health and Wellbeing team.

The UWA Safety, Health and Wellbeing website offers further computer workstation ergonomic information at <http://www.safety.uwa.edu.au/health-wellbeing/physical/ergonomics/workstation>

## Manual handling

All workers must be trained in the appropriate manual handling techniques for any hazardous manual tasks that they are required to perform in their jobs and not expose themselves or others to the risk of injury. Workers must be aware of, and utilise the mechanisms that exist within the workplace to:

1. Identify hazardous manual tasks that exist,
2. Assess the risks arising from the identified hazardous manual tasks that,
3. Decide on the appropriate use of control measures.

If individuals feel that they are unable to undertake any manual handling task, because it is beyond their range of comfort and ability, they must seek assistance. In situations where individuals are required to perform new or unfamiliar manual tasks, supervisors should conduct a new risk assessment to identify any new potential hazards and implement and evaluate control strategies (i.e. mechanical solutions and/or training). Many injuries occur when workers undertake unfamiliar or non-routine tasks due to a lack of planning or risk assessment.

Where possible, mechanical handling equipment should be used (e.g. trolleys and fork lifts). All areas should develop and document a Manual Handling Risk Management Plan through consultation with Health and Safety Representatives and assistance from the Occupational Therapists in UWA Safety, Health and Wellbeing.

For information regarding the University Policy on Manual Handling refer to the UWA Safety, Health and Wellbeing website: [www.safety.uwa.edu.au/policies/manual\_handling](http://www.safety.uwa.edu.au/policies/manual_handling)

## Housekeeping

The maintenance of high standards of housekeeping in workplaces helps to prevent injuries. General tidiness includes such considerations as:

* Keeping floors tidy and dry
* Removing rubbish daily
* Avoid creating trip hazards such as trailing leads
* Keep work surfaces and resources such as fume cupboards, tidy, clean and free from equipment and hazardous substances that are not in use.
* Keeping aisles, exits, fire extinguishers, first aid kits and electrical cabinets free from obstruction
* Keeping glassware and breakables off the floor
* Informing contractors of workplace hazards that exist such as flammable liquids or combustibles
* Avoid exposing cleaners to hazards.
* If last to leave the workplace, make sure all equipment is turned off or left in a safe state and leave personal details with equipment/processes that need to be left running when unattended.

## Use of social media

The separation which otherwise exists between personal and professional expression can become blurred. Comments which relate to individuals or workplace colleagues may endure over time making them highly visible. Interconnectivity between social media sites can result in unexpected distribution to a wider audience than in the off-line world. The inappropriate use of social media in either a professional or personal capacity, can violate the privacy, breach the security and harm the reputations of other employees, students and/or the University. Such activity may be determined as misconduct or serious misconduct, resulting in possible disciplinary action or termination of employment. Workplace health and safety legislation could also be contravened. For further information, refer to The University policy on social media. As a general rule: If it would normally be acceptable to express an opinion about something off-line, it is equally acceptable online. Express thoughts and opinions rationally, respectfully and appropriately.

## Working alone

Individuals may occasionally be required to work alone on University premises. Under these circumstances there are special risks due to the lack of immediate assistance in the event of an accident or sudden illness. This guidance applies to working alone at any time but when planning after-hours working there are specific limitations on accessing workplaces and also on the types of work that may be undertaken.

Refer to “After-hours working” in this manual and also see <http://www.safety.uwa.edu.au/health-wellbeing/physical/after-hours-working>.

Health and safety legislation requires that if an employee is isolated from other persons because of the time, location or nature of the work then the employer must ensure that there is a means of communication available which will enable the employee to call for help in the event of an emergency and arrangements made to ensure regular contact. The maximum penalty for breaching this regulation is $25,000.

If you are required or intend to work alone you must have permission to do so from a Manager or Supervisor who has assessed risks associated with the planned activities, considered the availability of any potentially required support services and concluded that such working arrangements are acceptable. This may include addressing unattended reactions or experiments. In addition, disclosure and consideration of any medical conditions that may give rise to a dangerous or life threatening situation when working alone must be taken into account.

In all of the following cases, working alone is **not permitted** where:

* There is no readily accessible means of communication.
* Work which is remote or isolated from the assistance of others due to the location, nature or time.
* Operation or maintenance of hazardous equipment
* Handling of hazardous substances or use of large volumes of flammable solvents.
* Work which is too hazardous for a person to perform alone.
* Working with large or aggressive animals.
* Maintenance or adjustments on energised electrical or electronic systems.

Under the following circumstances, working alone **is permissible**:

* An authorised person is notified of the planned work, when it will commence and the expected completion time.
* Staff and students may work alone in office and other low risk environments.
* An easily accessible means of communication to gain assistance in an emergency is available.
* Undertake all required personal security measures e.g. lock doors, walk in well-lit areas.

The campus emergency number is 6488 2222. UWA Security (phone 6488 3020) offer a 24 hour escort service to vehicle or residences near the campus and also offer lectures on personal security. To request their assistance telephone 6488 3020 allow up to 20 minutes’ notice for the escorting service.

WorkSafe WA provide guidance regarding working alone and how it influences the risk of harm or injury at <http://www.commerce.wa.gov.au/publications/guidance-note-working-alone>

This information is also available at <http://www.safety.uwa.edu.au/health-wellbeing/physical/alone>.

## After-hours working

An important consideration when working outside of normal working hours is the times of day when maximum internal and external support services are available in the event of an incident, injury or illness. Such services include First Aid Officers, the Medical Centre, Facilities Management, Building Operations, external emergency services and UWA Safety, Health and Wellbeing.

In all workplaces, if you are required or intend to work outside of normal working hours, you must have permission to do so from a Manager or Supervisor who has assessed risks associated with the planned activities, considered the availability of any potentially required support services and concluded that such working arrangements are acceptable. In hazardous workplaces, where the type of work, the resources used and the risks to the health and safety of workers is significant, the periods of normal use should be restricted to 8:00 am - 5:00 pm on weekdays only.

Persons wishing to work outside normal hours may be required to provide a work plan that clearly defines the proposed task and limitations on that task outside normal working hours. They may need to fill in a log of arrival and departure times and advise Security on (+61 8) 6488 3020 or the appropriate number for laboratories not on the main University campus.

If accessing the workplace after hours:

* Ensure that the doors of buildings are securely closed and locked after entering and exiting.
* Ensure that the doors to internal areas are secured on leaving.
* Ensure familiarity with health and safety rules and emergency contact numbers (these should already be displayed in the workplace.
* Do not give anyone else security codes, keys or access cards.
* Do not provide access to buildings to unauthorised persons as Security is instructed to remove them if they cannot demonstrate current authorisation.
* Report to University Security any breaches of security or suspicious behaviour.

Some work is too hazardous to be undertaken alone or after hours. This includes any activities involving:

* Hydrofluoric acid.
* Explosive and potentially unstable substances.
* Disposal of hazardous substances.
* Naked flames associated with flammable solvents.
* Low-temperature environments (e.g. cool rooms, freezers).
* High-powered, fast-moving machinery or equipment.
* Heights or confined spaces.
* Significant quantities of molten metals.
* Other hazards or activities as identified by the Manager or Supervisor.

Only competent persons may operate inherently hazardous equipment. A documented risk assessment must be made and/or adequate control measures must be implemented. Work by undergraduate students may only be performed if directly supervised by a staff member or approved nominee. A minimum of two persons must be present to ensure that appropriate action and support is provided in the event of an incident or injury. The second person must be competent to obtain any assistance required and to make the area safe. If having a minimum of two people present is not possible, there are specific limitations on what types of work may be conducted. Refer to “Working alone” in this manual and also <http://www.safety.uwa.edu.au/health-wellbeing/physical/alone>. A breach of any of these conditions may result in after-hours access being cancelled. This information is also available at [www.safety.uwa.edu.au/health-wellbeing/physical/after-hours-working](http://www.safety.uwa.edu.au/health-wellbeing/physical/after-hours-working).

# LOCAL RULES

## Safety inductions

All persons shall complete safety inductions before undertaking any tasks or activities in the workplace. Information on safety induction processes and guidance to determine which inductions must be completed is provided at <http://www.safety.uwa.edu.au/induction-and-training/online>. A fundamental aspect of induction is to gain an understanding of and to acknowledge workplace local rules. Induction does not infer competency or permission to commence work. Persons shall only carry out work using resources which they are deemed competent to use and shall do so only with permission of the area supervisor. A record of completed inductions shall be included in the individual’s training records.

## Competency and training

Workers shall only carry out work using resources which they are deemed competent to use. Competency can only be judged through assessment by a Supervisor. Hazardous equipment shall only be used by operators where their competence to do so can be verified via written records based on qualification and/or ‘demonstrable competence’ (see definitions). The need for specialist training shall be identified by managers and supervisors and all such requirements must be escalated via workplace line management. Individuals shall not be expected to undertake any activities for which they are not deemed competent.

## Management and permission to work in the area

Managers and supervisors have control of and are responsible for workplaces and are authorised to give permission to do work. Permission to carry out work in a workplace may only be granted to individuals for whom their competency to do so can be demonstrated. Records of that competence must exist and be available for inspection. A combination of endorsement of documented methods, appropriate supervision (to be established and reviewed on a case by case basis) and verbal consent may be sufficient as a basis for granting permission to work provided it can be demonstrated that the individuals who carry out work meet the following criteria for ‘demonstrable competency’ (see definitions).

## Workplace monitoring

All workplaces shall carry out periodic monitoring to ensure that good health and safety standards are being maintained. Workplaces should be inspected on an annual basis. This can be achieved through the Safety, Health and Wellbeing website where checklists are available for a variety of area types. Site inspections should be conducted if the following changes are made to an area - new projects, personnel, plant, equipment, procedures or refurbishment. Other monitoring processes include the Traffic Light System and the UWA Internal Audit programme which evaluates the performance of the occupational health and safety management system against the AS/NZS4801 OHSMS Standard. Workplace monitoring is usually coordinated by the workplace Health and Safety Committee.

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Frequency** | **Details** | **Responsibility** |
| **School Safety Inductions** | Held bi-annually and compulsory for all new staff and students | School safety induction conducted by Plant Biology Safety Office. All safety induction checklist to be completed, signed and forwarded to the School Adminisrative Officer. Copy given to employee/student. | Supervisor |
| **Site specific safety induction** | Upon commencement | To be completed within one week of new staff, visitors or students commencing in the school and copy to be provided to the School Adminisrative Officer. | Supervisor |
| **Training** | Ongoing | Training requirements should be ascertained upon commencement in the school and undertaken as required when refreshing skills or operating new items of equipment. | Supervisor |
| **Risk Management Assessment** | Ongoing | 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. | Supervisor |
| **Review Safety Signage**  | Ongoing | All relevant safety signage in the labs, workspaces and in building to be reviewed on an ongoing basis to ensure availability of appropriate signage. | Supervisor |
| **First Aid Boxes** | Quarterly | All first aid boxes to be checked for availability of required first aid material | First Aid Officers |
| **Hazard and Incident Report Forms** | As and when required | 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. | Supervisor |
| **Electrical Equipment Testing** | Ongoing | 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) | Supervisor |
| **Emergency Exit Checks** | Monthly | All emergency exits and exit routes should be kept clear at all times. | Fire Wardens |
| **Workplace Safety Inspections** | Quarterly | There is a requirement under UWA Responsibilities and Accountability for supervisors to carry out regular workplace inspections. S&H Reps should be invited to attend. Complete relevant checklists as per the Lab/Workshop S&H Schedule and forward to School Manager. | Supervisor |
| **School Safety Committee Meetings** | Quarterly(min. requirement) | Official forum through which individual and School safety issues may be raised and addressed. | Chair, Safety Committee |
| **Fire Extinguishers** | Six monthly | All fire extinguishers to be tested for effectiveness  | Safety and Health |
| **Fire Warden Training** | Annually | Fire wardens to undertake training through the Safety & Health Office | Building Fire Warden |
| **Fire Drill** | Annually | Annual fire drill for the Plant Biology Buildings | Safety and Health |
| **Review of School Safety Plan** | Annually | A School Safety Plan, including risk management schedule should be reviewed annually and acted on throughout the year. | Safety Committee |
| **Testing of Emergency Equipment** | Annually | Regular testing of emergency equipment (e.g. emergency showers, etc.) should be undertaken |  S&H Representative |

Refer to <http://www.safety.uwa.edu.au/management/monitoring> for information on monitoring processes.

Refer to <http://www.safety.uwa.edu.au/management/committees> for the prescribed monitoring schedule.

## Standard Operating Procedures (SOP) for hazardous equipment

All hazardous equipment in the workplace is to be risk assessed by creation of SOPs. These single page reference documents are to be displayed such that they may be referred to at the location of use of the equipment. Individuals will be trained to use hazardous equipment and will sign a copy of the SOP which will be stored in their training records once they are deemed to be competent operators by a supervisor or manager. Hazardous equipment may only be used by competent operators. For further information regarding SOPs refer to Risk Management; section 9.2 - Assessing hazards associated with resources.

## Emergencies, Incidents and Injuries

### Emergency Information

|  |  |
| --- | --- |
| **CONTACT** | **TELEPHONE** |
| **UWA Emergency for Fire Brigade, Ambulance, Police** | **6488 2222 (24 hrs.)** |
| **UWA Security** | **6488 3020** |

Refer to the [Staff and Support](http://www.safety.uwa.edu.au/staff-support) webpage of the UWA Safety, Health and Wellbeing website for further information including lists of safety personnel and a blank Building Safety Personnel Poster for completion and display in in prominent locations.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **TELEPHONE** | **NAME** | **LOCATION** |
|  | **TELEPHONE** | **NAME** | **LOCATION** |
| **Building Warden** | 6488 2541 | Alan Luks | 1st Floor Central Agricultural Building, Rm:1.120 |
| **Deputy Building warden** | 6488 3863 | Pandy du Preez | 1st Floor Central Agricultural Building, Rm:1.120 |
| **Health and Safety Representative** | 6488 2573 | Elizabeth Halladin | Ground floor Soil Science Building, Rm:G202  |
| **Health and Safety Representative** | 6488 3598 | Hai Ngo | 2nd Floor Botany Building, Rm:2.04 |
| **Safety Officer - School** | 6488 2541 | Alan Luks | 1st Floor Central Agricultural Building, Rm:1.120 |
| **Safety Officer - Radiation** | 6488 1240  | Guijun Yan | 2nd Floor Central Agricultural Building, Rm:2.129 |
| **Safety Officer - Biological** | 6488 8546 | Patrick Finnegan | 1st Floor North Wing Agricultural Building, Rm:1027 |
| **Safety Officer - Chemical** | 6488 1789 | Greg Cawthray | 2nd Floor Central Agricultural Building, Rm: 2.131 |
| **First Aider(s)** | 6488 2206 | April Harris | 1st Floor Central Agricultural Building, Rm:1.120 |
|  | 6488 3598 | Hai Ngo | 2nd Floor Botany Building, Rm:2.04 |
|  | 6488 4758 | Bill Piasini | Plant Growth Facilities  |
|  | 6488 2573 | Elizabeth Halladin | Ground floor Soil Science Building, Rm:G202  |

|  |  |  |  |
| --- | --- | --- | --- |
| **First Aid box location(s)** | All Laboratories Spaces  | 2nd Floor Hallway, Central Wing Agricultural Building | 1st Floor Hallway, North Wing Agricultural Building |

|  |  |
| --- | --- |
| **Evacuation Assembly Area** | Thurling Green and main foot path area outside the Faculty of Science Student office |
| **Exit Routes from the building** | **Central Wing:** Ground floor: exits central entrance, end of corridors.First and Second floors - fire escape exits at either end of the corridors on first and second floors. Can also use the central staircase. |
| **Botany Building:** Ground floor: exits through the main doors, in foyer entrance or inner courtyard.First and second floors: exit by the stairs at either end of the main corridors and out through the main foyer entrance or the inner courtyard.**Annexes:** Exit through the main entrance found at each end of the building. |

### In the Event of Fire

**RAISE THE ALARM:**

If safe to do so, ensure the immediate safety of anyone within the vicinity of the fire. Raise the alarm if not already sounding, using a break glass alarm panel or by shouting ‘Fire, Fire, Fire’ if a panel is not available. The alarm system automatically notifies the Fire and Rescue Services and also UWA Security (who then notify other emergency personnel).

Phone the UWA Emergency number extension 2222. Give your name, building, level, room number, type and extent of the fire / smoke and inform your supervisor or Building Warden if safe to do so.

**FIRE FIGHTING:**

If safe to do so and if trained in the use of fire equipment, attempt to extinguish the fire. Do not use fire hose reel, water or foam extinguishers on an electrical fire.

**FIRE EXTINGUISHERS:**

All fire extinguishers are tested to ensure reliability on a regular basis by a contractor sourced by Facilities Management. This equipment is provided to extinguish minor fires only. If there is any risk from the fire, the building must be evacuated. Before using a fire extinguisher read the instructions ensuring that it is appropriate to the type of fire.

* **Water Type Extinguisher (colour coded red):** For use on paper, wood, textile and fabric fires only - not to be used on electrical or chemical fires.
* **Carbon Dioxide Extinguisher (colour coded red with a black band):** For use on electrical and flammable liquids fire – Please note that this extinguisher can be safely used on all types of fires, however, when the carbon dioxide dissipates, re-ignition could occur.
* **Dry Powder Extinguisher (colour coded red with a white band):** For use on electrical, flammable gases and flammable liquid fires.

**EVACUATION:**

Evacuate the building in accordance with the area evacuation procedure or as directed by the Building Warden. Proceed to the nearest exit, walking quickly and calmly to the assembly area and do not use the lifts. Close but do not lock doors and windows as you exit. Leave lights on. Remain in the assembly area in groups until instructed to leave by a Warden or Fire and Rescue Services personnel. Do not re-enter the building until informed that it is safe to do so by a Warden or Fire and Rescue Services personnel.

### Incidents and Injuries

If contaminated with acids or alkalis, wash skin immediately with plenty of water then seek medical attention if required. Eyes splashed with any chemical must be washed with water for 15 mins and medical advice obtained immediately. Ensure all incidents and injuries are reported to Supervisors and on a UWA Confidential Incident / Injury / Near Miss Report Form. <http://www.safety.uwa.edu.au/incidents-injuries-emergency/notification>

## General rules for workshops and laboratories

* Safety glasses must be worn
* Hearing protection must be worn when using noisy machinery
* Closed-in footwear must be worn
* Only use equipment with permission from the supervisor. You must have been inducted and deemed competent
* Long hair must be tied back
* Visitors must remain within marked walkways
* Take care when using compressed air
* Clean all equipment after use
* Loose clothing must be tucked in or not worn
* Wear lab coats and gloves as per local rules
* Cover all open wounds when handling chemicals, animals or other biological material. Band aids and dressings are available in first aid boxes.
* Use disinfectants after handling suspected infectious materials
* When pipetting always use mechanical devices - never pipette by mouth
* Keep fume cupboard sashes closed whenever practicable
* Do not allow air-flow into fume cupboards to be impeded
* Avoid accumulation of flammable substances
* Keep only minimal required quantities of chemicals in laboratories
* Wash hands and remove lab coats before leaving the laboratory
* Do not store food or drink in chemical storage refrigerators

See also <http://www.safety.uwa.edu.au/policies/safety_in_workshops>

## Gas cylinders

### Classification of Gases

Compressed, liquefied or dissolved gases are categorised as Class 2 dangerous goods and sub-categorised as:

* Class 2.1 Flammable gases identified by a red dangerous goods diamond (e.g. Butane)
* Class 2.2 Non-flammable and non-toxic gases identified by a green dangerous goods diamond (e.g. Helium)
* Class 2.3 Poisonous gases identified by a white dangerous goods diamond (e.g. Ammonia)

In instances where the gas presents multiple hazards, additional diamond shaped warning signs indicate the subsidiary risks. For example, Chlorine Class 2.3 (toxicity) and Class 5a (oxidising agent)

### Movement of Gas Cylinders

The majority of incidents involving gas cylinders occur while moving them from one location to another. The following control measures must be applied to reduce the potential for an incident:

* The use of purpose-built trolleys or other suitable devices for gas cylinder transportation.
* Closing the gas cylinder’s valve, disconnecting and removing associated regulators and distribution equipment.
* Only trained personnel are permitted to move cylinders.
* Use properly designed lifting equipment for the movement of larger gas cylinders.

### Storage of Gas Cylinders

The following precautions shall be observed for minor storage and handling of gas cylinders (minor is formally defined – contact UWA Safety, Health and Wellbeing for advice)

* Gas cylinders are to be kept away from artificial sources of heat, i.e. radiators, boilers or steam pipes.
* Gas cylinders shall be provided with adequate ventilation at all times.
* Classes of gas cylinders shall be segregated within the store, but need not be separated.
* Outdoor storage of Class 2 cylinders shall be separated from other dangerous goods by 3 metres. They shall not be less than 1 metre from any door, window, air vent or duct.
* All gas cylinders are to be secured in the upright position by chain or other means to prevent falling.

Indoor storage of gas cylinders should be avoided wherever possible. However where it is not reasonable to have an outdoor cylinder and reticulation system, the indoor storage / use of gas cylinders shall incorporate a risk management approach.

### Gas Cylinders – Local Rules

All gas cylinders in the School of Plant Bology 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 on the walkway, ground floor of the Botany building. Please return it after use. This rule applies to all gas cylinders, whether thay are full, in use, empty or dive cylinders. Cylinders of compressed gas must be turned off at the cylinder valve when not in use.

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.

### Precautions for Specific Gases:

|  |  |
| --- | --- |
| Oxygen | Do not use grease/oil on oxygen cylinders or pipe work Do not use as a substitute for compressed air. |
| Acetylene | Use only approved regulating valvesAvoid pipe fittings containing 65% or more copper (these cause the formation of explosive acetylides)Explosive range of acetylene in air 2%-82% acetylene V/V |
| Nitrous Oxide | Similar to those of oxygen |
| Hydrogen | Explosive range in air 4%-75% hydrogen V/V |

## Borrowing Equipment

If you wish to borrow equipment from a specific research group or Glasshouse within the School, please obtain permission from the person responsible for the item.

If you are borrowing anything form the botany teaching store room on the ground floor, please fill in the borrowers book. Please be aware that the equipment in that area are for teaching requirements, and could be recalled at any time should it be required for teaching. If you require assistance when borrowing equipment please contact the plant biology teaching lab technicians.

### Using New Equipment

If you are using equipment you have not used before or unfamilar with, please obtain full instructions of use by a confidence user. Failure to do so may lead to personal injury and damage to the equipment.

## Hazardous chemicals or substances

Regard all substances as hazardous unless there is definite information to the contrary. It is a mandatory requirement to be in possession of a Material Data Safety Sheet and to complete a risk assessment relating to use of all hazardous chemicals or substances. For further information regarding risk assessments see section - **Risk Management**.

For work with carcinogens, toxins and embryotoxins, cryogenics, herbicides/pesticides, peroxidizables, organic and shock sensitive, cyanides, acid fluoride chemicals and gas cylinders refer to MSDS and the UWA Chemical Safety Procedures.

* Clearly label all containers within the working area.
* Use safety carriers for transporting either glass or plastic containers with a capacity of 2 litres or greater.
* Do not store flammables (Dangerous Goods class 3) in a domestic refrigerator (cooling and storage of flammables must only be stored in a spark proof refrigerator or freezer). Chemical storage refrigerators must never be used to store food or drink.
* Segregate and store all Dangerous Goods according to class not based purely on alphabetical listing.
* Hazardous substances must be disposed of in accordance with University policy, statutory and MSDS requirements. Areas must provide suitable waste disposal containers and are responsible for their removal by an approved waste disposal contractor (refer to the Chemical Safety Procedures). The University co-ordinates a biannual campus wide waste collection to consolidate costs of disposal, for details refer to http://www.safety.uwa.edu.au/topics/chemical/waste-service
* Use the correct containers provided to dispose of glass, sharps, metal, paper, infectious, OGTR, AQIS waste etc. (Regularly check disposals against licence requirements).
* Chemical waste is not to be disposed of via sinks, drains or stormwater channels unless using neutralisation processes approved by the WA Water Corporation. For further details, refer to: http://www.safety.uwa.edu.au/topics/waste/chemicals-to-sewer

### Laboratory Emergency Response Procedures

<http://www.safety.uwa.edu.au/policies/../policies/laboratory_emergency_response>

|  |  |  |
| --- | --- | --- |
| Emergency and precautions | Minor  | Major |
| Medical | 1. Initiate first aid
2. Report incident
 | 1. Remain calm
2. Initiate lifesaving measures if required
3. Do not move person unless there is danger of further harm
4. Keep person warm
5. Call for emergency response
 |
| FireSmall fires can be extinguished 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 | 1. Alert people in laboratory and activate alarm.
2. Smother fire or use correct fire extinguisher.
3. Aim extinguisher at base of fire.
4. Always maintain accessible exit.
5. Avoid smoke or fumes
 | 1. Alert people in area to evacuate.
2. Activate nearest fire alarm or call Security number.
3. Close doors to confine fire.
4. Evacuate to safe area or exit building through stairwell; do not use lift.
5. Have personknowledgeable of incident and laboratory assist emergency personnel
 |
| Chemical spillThe range and quantity of hazardous substances used in laboratories require preplanning (i.e. a Risk Assessment) 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 | 1. Alert people in immediate area of spill.
2. Wear protective equipment, including safety goggles, gloves, and long-sleeve lab coat.
3. Avoid breathing vapors from spill.
4. Confine spill to small area.
5. Use appropriate kit to neutralize and absorb inorganic acids and bases. Collect residue, place in container, and dispose as chemical waste.
6. 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.
 | 1. Attend to injured or contaminated persons and remove them from exposure.
2. Alert people in the laboratory to evacuate.
3. If spilled material is flammable, turn off ignition and heat sources.
4. Call for assistance.
5. Close doors to affected area.
6. Have person knowledgeable of incident and laboratory assist emergency personnel.
 |
| Biological spillBiological 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 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. | 1. Wear disposable gloves.
2. Soak paper towels in disinfectant and place over spill area.
3. Place towels in plastic bag for disposal.
4. Clean spill area with fresh towels soaked in disinfectant.
 | 1. Attend to injured or contaminated persons and remove them from exposure.
2. Alert people in immediate area of spill.
3. Close doors to affected area.
4. Put on protective equipment.
5. Cover spill with paper towels or other absorbent materials.
6. 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.
7. Allow a 20-minute contact period.
8. Use paper towels to wipe up the spill, working from the edges into the center.
9. Clean spill area with fresh towels soaked in disinfectant.
10. Place towels in a plastic bag and decontaminate in an autoclave.
11. Have person knowledgeable of the incident and laboratory assist emergency personnel.
 |
| Radioactive spillSpreading of radiation beyond the spill area can easily occur by the movement of personnel involved in the spill or cleanup effort . Prevent spread by confining movement of personnel until they have been monitored and found free of contamination. A minor radiation spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. All other radiation spills are considered to be major. | 1. Alert people in immediate area of spill. Notify DRSO. Wear protective equipment, including safety goggles, disposable gloves, shoe covers, and long-sleeve lab coat.
2. Place absorbent paper towels over liquid spill. Place towels dampened with water over spills of solid materials.
3. Using forceps, place towels in plastic bag. Dispose in radioactive waste box.
4. Monitor area, hands, and shoes for contamination with an appropriate survey meter or method. Repeat cleanup until contamination is no longer detected.
 | 1. Attend to injured or contaminated persons and remove them from exposure Alert people in the laboratory to evacuate.
2. Have potentially contaminated personnel stay in one area until they have been monitored and shown to be free of contamination.
3. Call SRSO.
4. Close doors and prevent entrance into affected area.
5. Have person knowledgeable of incident and laboratory assist emergency personnel.
 |

|  |
| --- |
| Contact with person |
| Emergency | Action |
| Clothing on fire | 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. |
| Radioactive spill on body | Remove contaminated clothing. Rinse exposed area thoroughly with water. Obtain medical attention, if necessary. Report incident to supervisor and School Radiation Safety Officer. |
| Chemical spill on body | 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. |
| Biological spill on body | Remove contaminated clothing. 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. |

### Spillage clean Ups

* Evacuate the area
* Notify safety personnel
* 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 (Na2CO3). 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.**

### Chemical Safety

#### 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.

* Any chemcial classifed as Dangerous &/or Hazardous must have a risk assessment assoctaited with it that is to be completed before the substance can be ordered. For further information regarding risk assessments, see section 9 - Risk Management.
* It is the responsibility of the user ordering chemical - to use, store and dispose of all chemical in a completely safe manner. All chemicals must be accounted for at the conclusion of a project.
* 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.
* Safety carriers are to be utilised for transporting either 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.
* 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. Seek immediate assistance is unsure of correct practice.
* Always order and work with the smallest amounts of chemicals required for the procedure.
* All chemicals must be handled with care. When using noxious or corrosive chemicals adhere to the MSDSinstructions relating to the use, handling and first aid procedures for the chemicals being used.
* Do not use chemicals or equipment without the consent of the 'owner'. Your chemical residues can ruin someone else's ongoing experiment.
* Fume-cupboards are to be used for removing gases, dusts, mists, vapour and fumes from laboratory operations. Always use a fume-cupboard when using solvents, 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.
* All containers of decanted chemicals, reagents, etc. must be fully labelled and include all details of hazards (toxicity, flammability). Labels are available from ChemAlert,refer to section 8.10.2.5

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> ). 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.

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

#### Chemical Warnings and Procedures

#### **Liquid nitrogen**

If you are handling liquid nitrogen, long 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**.

When liquid nitrogen evaporates it produces 680x its volume in gaseous N2, as such it poses a significant asphyxiant hazard and should never be used in confined spaces. This means never travel in an elevator with any amount of 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. Information on the Procedures for the use of Liquid Nitrogen in the School of Plant Biology can be located at: http://www.plants.uwa.edu.au/staff/safety\_and\_inductions

#### **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 place a label 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, School Chemical Safety officer or Safety and Health Rep. 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 also cause severe frostbite burns, it has an expansion rate of approximately 32x when subliming from the solid to gaseous phase. 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 is not reccommended 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. A risk assessment is mandatory with such work.

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 must 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 saturated KCN at room temperature. Alarming symptoms can occur at much lower levels.
* Gaseous HCN at 500 parts per million is immediately fatal through respiratory failure.
* 100 parts per million 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 caried out in this facility. Contact Elizabeth Halladin for training is use of this room.

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

* 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 must be worn. When using large quantities, a rubber apron and rubber boots must 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 Plant Biology Lab Technician Hai Ngo

When handling or working with GMA a laboratory dress code is required

* 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.

When handling GMA liquid the following precautions are to be adhered to:

* 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 extremely 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 .

Decide to use an agrichemical only after you have:

* Correctly identifying the pest, disease or weed and the degree of infestation or infection.
* Consided alternative control methods
* Assesse 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.

When selecting the correct product, make sure the 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.

When using a agricultural chemical follow the following Safety Advice

* 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 hands, face, arms, ect immediately 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 <http://www.safety.uwa.edu.au/policies/safe_use_of_pesticides>

#### Labeling Chemicals

Any new chemical brought into the School must have the responsible persons name and the date of arrival written on the container. As such, please include the following information:

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

**Correct labelling** of all chemicals is critical to work place safety, **is a legal requirement** and avoids costly disposal of unknown products. There are different labelling requirements for hazardous and non-hazardous substances and also for chemical wastes. Commercially available chemicals should be appropriately labelled by the manufacturer, and will not generally require re-labelling. However, if a label is damaged, obscured, or chemicals are decanted into a new container or used to make a new solution, a new label displaying the necessary information is required.

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 may not know that it contains glycerol, which becomes highly explosive when in contact with nitric and sulphuric acids.

The following information indicates what is required for different types of chemical products, and how to print labels from the Universitys preferred chemical database, ChemAlert. For in depth details as to the requirments for labelling of workplace hazardous chemicals, refer to WorkSafe Australia’s code of practice current as of March 2015 at;

http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/labelling-hazardous-chemicals-cop

**Labelling Hazardous Substances** (to determine what constitutes hazardous, especially for prepared solutions, see the link to HSIS below)

Hazardous substances are required by law to be labelled with the following information:

* signal word(s) and/or dangerous goods class label
* product name, chemical name, United Nations Number, ingredients
* risk & safety phrases
* directions for use\*, first aid procedures & emergency procedures\*
* details of manufacturer or importer
* expiry date (where relevant)\* & reference to MSDS

All information above is required by law on the label of any hazardous substance in a container of 500 ml or 500 g or larger. If the container is smaller than this, the asterisked (\*) information can be omitted from the label. If the container is too small to have a label attached (i.e. 1ml Eppendorf), legislation requires that the label be tied to the container with string, or that the container is placed in an appropriately labelled outer container (refer to Occupational Safety and Health Regulations 1996 5.6 and National Code of Practice for the Labelling of Workplace Substances).

For substances that you are preparing such as buffers, then the hazardous nature of the substance at 1% concentration may well be non-existent. To check the hazardous cut-off values for substances, The Australian Safety and Compensation Council has set up a website where one can search the database for hazardous substances and look at the risk and safety facets of different concentrations of such substances.

***Hazardous Substances Information System (HSIS):***

 <http://hsis.safeworkaustralia.gov.au/HazardousSubstance>

**Summary of Instructions (Hazardous Substances Search)**

* Enter values in the search fields that you want to search on. To view additional search fields, click on *Advanced Search*.
* Choose the sort order of the results from the Sort By drop down menu (*CAS No* or *Name*)
* Check the *Show Exposure Standard Details* checkbox to view exposure standard details for substances found in the search.
* Choose the type of hazard classification classes you want included in the search by checking *Health (H)*, *Physicochemical (D)* and/or *Ecotoxicological (E)*.
* Click the *Search* button and wait for the results to be displayed.
* Click on the *View History* link in a record, where available, to view the change history of that hazardous substance.
* To convert the search results to a form that can be saved or printed, click the *Print/Save* button.
* Click *Reset* to clear all search fields, ready for a new search.

Attention should be made to the information contained in the “cut-offs” column, which is the level (expressed as a % on a weight/weight basis for solids and liquids and a volume/volume basis for gases) at and above which that substance is classified as a hazardous substance.

A mixture is classified as hazardous if it contains at least one ingredient at a concentration equal to, or above, the lowest concentration cut-off level given for that ingredient.

**PLEASE NOTE:**  Concentration cut-off levels refer to health hazards only, and are not associated with the physicochemical or environmental hazards of a substance.

To help decipher the Risk and Safety (R&S) phrases/numbers that are included with such searches, the website <http://hsis.safeworkaustralia.gov.au/SearchKey#RiskPhrases> provides explanations of what single or grouped R&S phrases mean.

***Labels using ChemAlert***

Labels containing all the legally required information can be printed for chemicals using ChemAlert by:

* opening ChemAlert (<https://chemalert.rmt.com.au/uwa/>), select ‘Anonymous User’ then select ‘ChemAlert’ then select ‘Search’
* enter the chemical requiring a label into the ‘Term to Search’ box
* right click on the product requiring a label and select ***view/print product report***
* select the desired label size from the ***Report Type*** drop down box
* click on the ***label setup*** button and selecting the desired number of labels
* and click ***view/print*** button



ChemAlert 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).

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**Labelling Non-Hazardous Substances**



Since non-hazardous substances should pose little threat to personnel there are less stringent labelling requirements for non-hazardous substances. Non-hazardous substances are required to be labelled with the following information:

* Full chemical name and concentration of constituents (abbreviations and chemical symbols/structures are not adequate)
* Name of the user and contact number
* Date
* Location (School/Section, building, lab number)

Non-hazardous substances can also be labelled via ChemAlert. However templates for printing labels of various sizes are available from the Safety, Health and Wellbeing website. These labels can be filled in electronically and printed onto label paper or printed and filled in by hand, providing a quick and easy solution to correctly labelling your non-hazardous substances

Non-Hazardous Substance Label Templates can be located at the bottom of the following web page:

<http://www.safety.uwa.edu.au/topics/chemical/labelling>

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**Labelling Chemical Wastes**

Offsite chemical waste disposal for Plant Biology is coordinated biannually via the UWA campus wide waste collection service, details of which can be found at: <http://www.safety.uwa.edu.au/topics/chemical/waste-service>

All chemical wastes must be correctly labelled to ensure the safety of personnel and to prevent costly disposal of unknown substances. Waste containers should be labelled before waste is collected and as far as practicable chemical wastes should be segregated. Segregation of wastes is a good safe work practice and makes disposal of waste as simple and as cheap as possible. Chemical waste must be labelled with a completed UWA chemical waste with the following information:

* Full chemical name and concentration of all constituents (abbreviations and chemical symbols/structures are not adequate)
* Indication as to whether the waste contains either hazardous substances or dangerous goods
* Name of the user and contact number
* Date over which the waste was collected
* Location (School/Section, building, lab number)

 Chemical Waste Label Templates can be located at the bottom of the following web page: <http://www.safety.uwa.edu.au/topics/chemical/labelling>

#### GM Regulations

Gene Technology Regulation Administrative procedures are outlined in detail on: <http://www.research.uwa.edu.au/485150> 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> More information can be obtained from the UWA Biological Safety Advisor or the Plant Biology Biologiacl Safety.

### 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 and Wellbeing website outlines these procedures in great detail.<http://www.safety.uwa.edu.au/policies#Chemical>

All chemical 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, chemical Safety officer and Health Rep immediately.

### 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_hazards> for full guidelines for dealing with biological hazards. See <http://www.safety.uwa.edu.au/policies#Biological> for biological safety requirements. Please see the Safety Committee list section 8.6.1 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.

#### Personal Protection Equipment (PPE)

## Personal Protective Equipment

Personal protective equipment (PPE) comprises a range of clothing and equipment which is worn by employees, students, contractors or visitors to protect or shield their bodies from workplace hazards. <http://www.safety.uwa.edu.au/page/8750>. Section 19 of the Act states (in part): An employer shall provide and maintain a working environment in which its employees are not exposed to hazards, 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 adequate personal protective clothing and equipment to protect them against those hazards, without 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, 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:

* Respiratory protection - eg disposable, cartridge, air line, half or full face
* Eye protection – eg spectacles/goggles, shields, visors
* Hearing Protection – eg ear muffs and plugs
* Hand Protection – eg gloves and barrier creams
* Foot protection – eg shoes/boots
* Head Protection – eg helmets, caps, hoods, hats
* Protection from falls - eg harness and fall arrest devices
* Skin Protection – eg hats, sunburn cream, long sleeved clothes
* Other personal protective equipment - eg protective clothing for cryogenic work or environments with high temperatures.
* 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. 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.
* Gloves MUST NOT be worn when opening/closing doors, have someone open the door for you if required
* Gloves MUST NOT be worn in corridors or offices
* Keep spare gloves in your lab coat pocket for use once you have left the laboratory and after entering another

### **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. 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:

* Must use the protective clothing or equipment in a manner in which he or she has been properly instructed to use it;
* Must not misuse or damage the clothing or equipment; and
* Must, as soon as practicable after becoming aware of any: damage to; malfunction of; or 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.

#### Safety Cabinets

There are class II biological safety cabinets in some Plant Biology laboratories.Class II biological safety cabinets (BSCs), are designed to remove or minimise exposures to hazardous biological materials. The class II biological safety cabinet (BSC) is used to provide containment of infectious splashes or aerosols generated by many microbiological procedures. A BSC has an inbuilt UV light for self sterilisation.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].

#### Working in Fume Cupboards (FCs)

Decide whether a given operation needs to be done in a fume cupboard. Check manufacturer hazard sheets, or refer to the chemical’s safety literature and labels for chemicals. For unfamiliar materials, check Materials Data Safety Sheets (MSDS) then seek additional advice through the School safetypersonnel. Decide whether it would be better to trial on a small-scale expermint. 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 free 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 flowlights,all electrical, gas and plumbing services within the FC are working. A fire extinguisher within easy reach. 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.

**Key Points**

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

#### 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 cleaning. All infectious or toxic material stored in refrigerators or deep freezers must be properly labelled with the contents, full name of the owner and the date (dd/mm/yy). Discard old specimens or samples when they are no longer needed. Do not store chemicals, food or drink in laboratory refrigerators.

### 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 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. 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 121oC
* 2 minutes at 132oC

### 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 or incineration, before disposal.
* 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>

Needlestick/Sharps injury and disposal of sharps procedures:

<http://www.safety.uwa.edu.au/page/22720>

#### Sharps disposal Requirement in Biological Procedures

'Sharps' require particular care before disposal. They should be placed in a sharps container at the site of use. 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 clearly with a ‘Clinical Waste’ sticker
* 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 using 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.safety.uwa.edu.au/topics/biological/hazards#dna. For advice, contact the School Biological Safety Officer.

### Radiation Safety

**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 a facility where work is carried out has to comply with strict safety regulations. Within the Faculty of Science there are several areas that have been classified suitable for radioactive work. These areas have different lab ratings which restrict the types of activities that can occur. 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 need 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. The course serves to provide basic introduction to the safety practices involved. Staff who 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, Health and wellbeing 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, Health and wellbeing web page, please refer to: <http://www.safety.uwa.edu.au/topics/radiation>

**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 Laboratory Emergency Response Procedures

• X-ray equipment X-ray equipment

• Radioactive materials Radioactive materials

• Lasers Lasers

• Ultraviolet light and transilluminators/uv-transilluminatorsUltraviolet light / Transilluminators

• Radiofrequency radiation

• Microwave ovens and radiation Microwave ovens and radiation

• Nuclear moisture/density gauges Neutron moisture gauges / density gauge guidelines

• Electric and magnetic fields

• Personal radiation monitoring Personal radiation monitoring

• School Radiation Safety Officers School Radiation Safety Officers (SRSOs)

• Local Laser Safety Officers (LLSOs) 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 with Radioactive Materials in Plant Biology

The following procedures have been modified from those available on the Safety, Health and Wellbeing 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.

Before doing any work with radioactive material you will need to organise

* A standard protocol. 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
* A personal monitoring badge.You should provide the SRSO with you email address and phone number when ordering the badge.
* Complete Unsealed Radioisotope Handling Course.
* You will need to obtain a copy of the working rules for use of radioactive materials
* Sign the register kept by the SRSO to confirm you have read and understood the rules.

Any advice concerning radiation safety should be obtained from your local SRSO. More information can be obtained from the Safety & Health website Radioactive Materials <http://www.safety.uwa.edu.au/page/8739>.Radiation Safety <http://www.safety.uwa.edu.au/page/8820> 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> ) prior to starting work using radioactive materials.

#### Personal Radiation Monitoring

* Personal radiation monitors are required to be worn by all persons when handling radioisotopes. These can be arranged through your SRSO, and UWA 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 project grant number when ordering your monitor. Be aware that there is an extra charge for monitors ordered out of cycle.

#### 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 Plant Biology Radiation Safety Officer (SRSO) or from the UWA Safety & Health Officer (SHO) .The forms must be completedand signed by the applicant, a radioactive licence holder and the SRSO 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.Changes may include alterations to the procedure, using larger activities or different radionucleotides or performing the work in different radioisotope laboratories.

#### Ordering Radioactive Material

Before you can order radionucleotides you must have a written approvel by the project supervisor and a completed protocol document for use of the radionucleotide. Before purchasing the radionculeotides the protocol document must be submitted and approved by the Safety & Health Office. All orders of radioactive material should be made through the school purchasing officer using online requisition form. You need to include a note in the special instruction box on the requisition form that the order is for a radionucleotide and must be ordered through the Safety & Health Office. You also should include the following information:

* UWA order number
* Supplier's name and correct address details
* Radionucleotides chemical name and product code
* Activity (Becquerels, Curies)
* Current protocol number
* Delivery address

All orders are checked to ensure that the protocol is current, the activity and location of use are within the UWA registration limits. Orders are normally emailed to the supplier on the same day that the order is placed through the Safety & Health Officer. We recommend you to include information on the date and time you wish to receive the order from the supplier for the 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 Safety & Health Officer, signed by the user and is then sent to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) for approval. ARPANSA charges a fee for each permit to allow import duties through Australian Customs of non-medical radioisotopes.

####  Records and Receipts

In order to prevent radioactive materials from being mislaid or forgotten, 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. Signed receipts should be obtained. 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 provide 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 radionucleotides 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 submitted the SRSO.

#### Radioactive Waste Disposal

You are responsible for the safe disposal of any radioactive waste that you produce. All solid radioactive waste must be correctly packaged and labelled for disposal, for information on how, please see the safety and health website <http://www.safety.uwa.edu.au/policies/radioactive_waste_disposal_procedures>. Radioactive wastes will need to be delivered to the Radioactive Waste Store, which is located in YY Block at the QEII Medical Centre.

#### 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>. All users must attend a Neutron Moisture Density Gauging Course and 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 Administrative officer.

## Local Access Restrictions

### Working in Laboratories

Safety in laboratories is the responsibility of the individual in addition to the lab supervisor. Staff and students should ensure that they are aware and trained in the safety considerations pertaining to each laboratory procedure 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 fully 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>. **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.

#### Plant Biology Analytical Facility/Laboratory

The Analytical Facility is located in Lab 2.135 of the Central Wing Agriculture building. 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) with various dection systems
* UV/Vis Spectrophotometer
* Freeze Dryer

#### Undergraduate Teaching Laboratories

Anyone who uses the Undergraduate teaching laboratories must first obtain permission from the Laboratory Technicians. 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 leave and store them in the appropriate cabinets or shelving.

#### Undergraduate Laboratories Background Information.

* Staff and students can use the teaching laboratories at any time, with the permission of the laboratory staff and providing that is doesn’t clash with Units practicals or the set up time required for unit practicals. Keys are available for after-hours use
* Students with laboratory staff permission can use all teaching laboratory equipment, however equipment is NOT to be removed from the labs including glass and plastic ware.
* If equipment is damaged it should be immediately reported to the laboratory staff so replacement can be arranged.
* Consumable items and chemicals should be obtained from the student’s own Group i.e. their supervisor’s teaching Group. The teaching laboratories will only supply consumables and chemicals if the Group has already ordered a replacement.
* 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.
* At NO time are the teaching laboratories to be used as a storeroom for samples etc.
* Proper health and safety procedures must be followed i.e 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.
* Laboratory staff are available most of the time for any assistance with experimental methodology.
* Field equipment borrowed from the teaching laboratories is to be returned and in clean working order.

#### General Laboratory Rules

Laboratory Code of Conduct <http://www.safety.uwa.edu.au/page/161587>

* No eating or drinking in any of the laboratories
* No smoking within the buildings or campus
* Enclosed strong soled shoes footwear must be worn at all times in the laboratories and buildings
* Laboratory coats must be worn when handling acids and bases or known carcinogens
* 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
* No chemicals, glassware or equipment to be carried in the stair wells
* When carring chemical bottles they are to be carried in appropriate carriers
* Safety glasses are to be worn at all times in laboratory areas, and other personal protective equipment as needed
* Never run in laboratories or along corridors
* All laboratory glassware must be washed, dried and returned to the appropriate location after use
* Laboratory benches must be left tidy at the end of working sessions, they must be cleaned of rubbish and wiped down
* 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
* 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**

#### Discarding of Sharps Safely in the Undergraduate Laboratory

* 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.

Needle stick/sharps injury/exposure body fluids ainjury report form is available for this type of incident/injury and can be located at: <http://www.safety.uwa.edu.au/page/31347>

#### Safe use of Centrifuges

Before using the centrifuges, inspect tubes for cracks, 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.

#### Laboratory Safety Inspection Checklist

The lab safety review checklist 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 problems that need to be fixed or looked into. 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

|  |  |
| --- | --- |
| **Building :**  |  **Lab No. Date of Inspection:**  |
| **Research Group and Occupants**:   |
| Supervisor: Extension: |
| Lab Manager : Extension:  |
| Inspected by (print name): |
| Submitted to (print name): |
| Lab Supervisor signature: Date |
| ALL recommended remedial action/s have been actioned - Signature: Date: |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| QUESTION | Y/Nn/a | REMARK/REMEDIAL ACTION RECOMMENDED | To be done by? | Date completed |
| 1. Induction
 |  |  |  |  |
| * 1. Is there proof that new staff are inducted into this area?
 |  |  |  |  |
| 1. Placarding
 |  |  |  |  |
| * 1. Is there placarding on the entrance to the lab showing safety symbols, PPE requirements, storage precautions and hazards?
 |  |  |  |  |
| * 1. Are warning signs clearly visible?
 |  |  |  |  |
| 1. Safe Working
 |  |  |  |  |
| * 1. Is a hard copy of the School Safety Manual available in the lab?
 |  |  |  |  |
| * 1. Are you aware where you can access it?
 |  | Current version can be found at: <http://www.plants.uwa.edu.au/for/staff> |  |  |
| * 1. Does the lab maintain written procedures:
		1. SWPs (Safe Work Procedure)
		2. RAs (Risk Assessment)
		3. SOPs (Safe Operating Procedure)
 |  |  |  |  |
| * 1. Is area tidy, clean and well kept? No obstructions to cupboards, fumehoods, on sinks, in fridge.
 |  |  |  |  |
| * 1. Are walkways and doorways free of obstructions and well lit
 |  |  |  |  |
| * 1. Are all hazards and incidents reported (through the UWA hazard/incident reporting system) and investigated?
 |  |  |  |  |
| * 1. Are hazardous areas clearly recognisable?
 |  |  |  |  |
| * 1. Are after hours contact numbers for responsible occupants displayed?
 |  |  |  |  |
| * 1. Do people comply with the working in isolation policy eg after-hours/ weekends?
 |  | <http://www.safety.uwa.edu.au/page/8719> |  |  |
| * 1. If work has to be left unattended, for example: overnight, is all apparatus well-labelled and door labelling carried out?
 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. Emergency Procedures
 |  |  |  |  |
| * 1. Do emergency procedures exist?
 |  | <http://www.safety.uwa.edu.au/policies/emergency_fire_and_evacuation><http://www.safety.uwa.edu.au/people/wardens/agriculture_central> |  |  |
| * 1. Are all occupants familiar with them?
 |  |  |  |  |
| * 1. Are the emergency procedures placarded in the lab?
 |  |  |  |  |
| * 1. Are emergency phone numbers displayed?
 |  |  University Emergency - 2222 |  |  |
| * 1. Are Emergency contacts displayed in the lab or on main door signage?
 |  |  |  |  |
| * 1. Are Emergency Exits to the lab clearly marked?
 |  |  |  |  |
| * 1. Are emergency plans practised regularly?
 |  |  |  |  |
| * 1. Is emergency equipment readily available?
		1. Spill kit
		2. Eye wash station
		3. Safety shower (location)
 |  |  |  |  |
| * 1. Is the Safety Shower accessible and tested regularly?
 |  |  |  |  |
| * 1. Is the Eye wash hose accessible and tested regularly?
 |  |  |  |  |
| * 1. Is emergency equipment checked monthly?
 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. First Aid
 |  |  |  |  |
| * 1. Are the locations of first aid kits known?
 |  |  |  |  |
| * 1. Are kits present / accessible?
 |  |  |  |  |
| * 1. Are the contents of the kits checked regularly (every three months)?
 |  | School First Aid Officer to action this | First Aid Officer | Ongoing |
| * 1. Are there certified first-aiders in the immediate workplace?
 |  |  |  |  |
| * 1. Are occupants aware who the nearest first-aiders are?
 |  | <http://www.safety.uwa.edu.au/people/fao>  |  |  |
| 1. Fire Protection
 |  |  |  |  |
| * 1. Is the Fire Extinguisher accessible with instructions intact?
 |  |  |  |  |
| * 1. Are extinguishers present correct types?
 |  |  |  |  |
| * 1. Has extinguisher been tested in last 6 months? (see tag)
 |  |  |  |  |
| * 1. Is there clear access to the extinguishers?
 |  |  |  |  |
| * 1. Has everyone been trained to use fire extinguishers?
 |  | \*Can be organised by School through SHR and UWA Safety Office<http://www.safety.uwa.edu.au/courses/faet>  | SSO, SHR & UWA SHO |  |
| * 1. Are fire blankets immediately available in area?
 |  |  |  |  |
| * 1. Does everyone know what to do in the event of fire?
 |  | <http://www.safety.uwa.edu.au/policies/emergency_fire_and_evacuation> |  |  |
| 1. Electrical Safety
 |  | <http://www.safety.uwa.edu.au/policies/electricalpolicy>  |  |  |
| * 1. Is electrical equipment in good condition, especially switches / powerpoints?
 |  |  |  |  |
| * 1. Are all portable items tagged with test details?
 |  |  |  |  |
| * 1. Are any items due for retesting?
 |  |  |  |  |
| * 1. Are extension leads in use?
 |  |  |  |  |
| * 1. Are double adaptors in use?
 |  |  |  |  |
| * 1. Are there trailing leads?
 |  |  |  |  |
| * 1. Are local heaters checked?
 |  |  |  |  |
| * 1. Are other electrical items checked eg: air conditioners?
 |  |  |  |  |
| * 1. Are electrical appliances used in 'wet' areas?
 |  |  |  |  |
| 1. Plant & Equipment
 |  |  |  |  |
| * 1. Is there a log book for use?
 |  |  |  |  |
| * 1. Are there warning labels/safe operating procedures near equipment?
 |  |  |  |  |
| * 1. Are safety guards used on mechanical equipment where required?
 |  |  |  |  |
| * 1. Is the maintenance schedule for med - high risk equipment adhered to?
 |  |  |  |  |
| * 1. Are maintenance records available?
 |  |  |  |  |
| * 1. Are gas cylinders safely secured?
 |  |  |  |  |
| * 1. Are there any gas cylinders not connected to equipment (i.e. lab storage)?
 |  |  |  |  |
| 1. GENERAL FACILITIES
 |  |  |  |  |
| * 1. Are eating/drinking areas isolated from work areas?
 |  |  |  |  |
| * 1. Are washing facilities adequate?
 |  |  |  |  |
| * 1. Is there adequate storage space (filing cabinets, shelves etc)?
 |  |  |  |  |
| 1. PERSONAL PROTECTIVE EQUIPMENT
 |  |  |  |  |
| * 1. Is personal protective equipment available where necessary?
 |  |  |  |  |
| * 1. Have staff been trained in its use?
 |  |  |  |  |
| * 1. Is personal protective equipment worn when necessary?
 |  |  |  |  |
| * 1. Is this equipment correctly stored and maintained?
 |  |  |  |  |
| * 1. Are the correct gloves being used for each task?
 |  |  |  |  |
| 1. Ergonomics
 |  |  |  |  |
| * 1. Are all frequently used items within easy reach?
 |  |  |  |  |
| * 1. Is the work area set-up to prevent undue twisting of the neck and trunk?
 |  |  |  |  |
| * 1. Is there a chair with adjustable height provided at the work bench where sitting/standing work is performed?
 |  |  |  |  |
| * 1. Can the lab worker get close to the workstation when seated? For example leg space under bench
 |  |  |  |  |
| * 1. Are adjustments on all chairs functioning properly?
 |  |  |  |  |
| * 1. Is the seat and backrest height of the chairs adjustable?
 |  |  |  |  |
| 1. Manual Handling (MH)
 |  |  |  |  |
| * 1. Is there adequate space for all movements involved in the MH task
 |  |  |  |  |
| * 1. Are heavy/awkward objects stored between knee and shoulder height?
 |  |  |  |  |
| * 1. Are correct MH techniques/ equipment used for lifting heavy/awkward or unstable items?
 |  |  |  |  |
| * 1. Is a step stool or step ladder readily available?
 |  |  |  |  |
| * 1. Are trolleys readily available?
 |  |  |  |  |
| 1. Chemical Safety
 |  | <http://www.safety.uwa.edu.au/about_chemical_safety>  |  |  |
| * 1. Have occupants been trained to safely handle chemicals and deal with chemical spills?
 |  |  |  |  |
| * 1. Are occupants aware of chemical hazards?
 |  |  |  |  |
| * 1. Are occupants following correct safety procedures?
 |  |  |  |  |
| * 1. Are Material Safety Data Sheets (MSDS) held for all substances?
 |  |  |  |  |
| * 1. Are they readily available in hard copy?
 |  |  |  |  |
| * 1. Is UWA Safety and Health contacted when an MSDS is not available on Chem Alert?
 |  |  |  |  |
| * 1. Does the lab have an up-to-date inventory of its chemicals (preferably via Chem Alert)?
 |  |  |  |  |
| * 1. Does the laboratory maintain a hard-copy record of the names, quantities and locations of all chemicals being held there?
 |  |  |  |  |
| * 1. Are occupants wearing appropriate protective equipment, e.g. appropriate footwear, safety glasses, gloves, and laboratory coats?
 |  |  |  |  |
| * 1. Are all chemical containers properly labelled (including chemicals that have been decanted)?
 |  |  |  |  |
| * 1. Does labelling include class labels (diamonds)?
 |  |  |  |  |
| * 1. Is there adequate storage space for chemicals?
 |  |  |  |  |
| * 1. Are they stored above eye height?
 |  |  |  |  |
| * 1. Are chemicals properly stored? (Segregation of incompatible chemicals)
 |  |  |  |  |
| * 1. Are correct containers being used to store substances?
 |  |  |  |  |
| * 1. Is there appropriate secondary containment to prevent spread of spills? Is there bunding or spill trays for the storage of liquids?
 |  |  |  |  |
| * 1. Are flammable chemicals stored in fireproof cabinets?
 |  |  | SHO  |  |
| * 1. Are flammable cabinets at least 3 m from powerpoints?
 |  |  |  |  |
| * 1. Are all chemical storage refrigerators spark-proof?
 |  |  |  |  |
| * 1. Are refrigerators suitably labeled (no food, no drink)?
 |  |  |  |  |
| * 1. Are safe decanting procedures in place?
 |  |  |  |  |
| * 1. Are spill kits clearly labelled and easily accessible?
 |  |  |  |  |
| * 1. Are winchesters and residue containers transported using carriers?
 |  |  |  |  |
| 1. Fume Cupboards
 |  |  |  |  |
| * 1. Are fume cupboards used when necessary?
 |  |  |  |  |
| * 1. Has/have cupboard/s been inspected and certified within the last 12 months?
 |  |  |  |  |
| * 1. Have they passed all tests?
 |  |  |  |  |
| * 1. Is the airflow checked each day?
 |  |  |  |  |
| * 1. Are they kept clear when no experiments are being conducted?
 |  |  |  |  |
| * 1. Are ‘experiments in progress’ labeled, and procedures outlined for emergency preparedness?
 |  |  |  |  |
| 1. Waste Disposal
 |  |  |  |  |
| * 1. Are staff familiar with waste disposal procedures?
 |  |  |  |  |
| * 1. Are procedures for chemical waste disposal followed?
 |  | Chemical waste is not to be disposed of via sinks, drains or stormwater channels unless using neutralisation processes approved by the WA Water Corporation. For further details, refer to: http://www.safety.uwa.edu.au/topics/waste/chemicals-to-sewerOffsite chemical waste disposal for Plant Biology is coordinated biannually via the UWA campus wide waste collection service, details of which can be found at: http://www.safety.uwa.edu.au/topics/chemical/waste-service |  |  |
| * 1. Is a glass bin being used?
 |  |  |  |  |
| * 1. Is a sharps bin being used?
 |  |  |  |  |
| * 1. Where appropriate, are waste containers available for biohazards waste, toxic or carcinogenic chemicals, other chemical waste, and radioactive waste?
 |  | Chemical waste is not to be disposed of via sinks, drains or stormwater channels unless using neutralisation processes approved by the WA Water Corporation. For further details, refer to: http://www.safety.uwa.edu.au/topics/waste/chemicals-to-sewerOffsite chemical waste disposal for Plant Biology is coordinated biannually via the UWA campus wide waste collection service, details of which can be found at: http://www.safety.uwa.edu.au/topics/chemical/waste-service. <http://www.fm.uwa.edu.au/about/policies/chemical_waste>  |  |  |
| * 1. Are waste containers labelled appropriately?
 |  |  |  |  |
| * 1. Are appropriate segregated waste disposal containers being used (plastic, no more than 5L)?
 |  |  |  |  |
| * 1. Is chemical waste labelled correctly?
 |  |  |  |  |
| 1. Radiation Safety
 |  | <http://www.safety.uwa.edu.au/radiation>  |  |  |
| * 1. Is the laboratory used for radiation work?
 |  |  |  |  |
| * 1. Is the laboratory labelled with radiation signage?
 |  |  |  |  |
| * 1. Are Radiation Badges used by lab personnel?
 |  |  |  |  |
| * 1. List of users of badges available?
 |  |  |  |  |
| * 1. Wipe test conducted in lab and log book easily located and in good condition?
 |  |  |  |  |
| * 1. Frequency of wipe tests?
 |  |  |  |  |
| 1. 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

### Plant Growth Facility (PGF)

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 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 supervisors in charged with the management of others are responsible for their safety and health standards. All staff, students and contractors must recognise their individual, joint responsibilities and cooperate ensuring that the highest possible safety and health standards are maintained when undertaking activities on the plant growth facility.

Basic standards need to be maintained:

* Follow the Health and Safety guidelines
* Fully enclosed footwear is to be worn at all times when 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.
* Treat all equipment with respect and leave in proper working condition for others to use.
* 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 use of compressed gases e.g. 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 and PGF Closure:

* 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.
* All S6 and S7 pesticides not for research use will be applied by trained and equipped PFG 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 are products 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. Legionaires 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; collect mixture 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 the tips provided below as a guideline to lifting loads on and off the 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: Contact the Field Station Manager either by phone: 9387 3384, mobile: 0419 930 407, or email: michael.blair@uwa.edu.au for all field station needs and enquiry’s.

Visitors: All visitors to the Field Station research facility MUST sign in and sign out for safety and security reasons. The sign-in book is located in the entrance to the Eastern Laboratory.

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

Field Station facilities:

* 13 Screen houses (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 (e.g. 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, you will have to demonstrate that you are knowledgeable and confident in the operation of the machinery. If you are unsure how to use the equipment, please ask the technician for help. If visiting the Field Station for the first time, you must contact the field station manager to organise a health and safety induction of the facility. If you require after-hour access to the Field Station please arrange for access to the gate and front. If you intend to enter the laboratory areas after-hours you will have to be issued with a PIN number for the security system. The field station manager is able to issue you with both the keys and the PIN number. You must comply with UWA after hour’s policy and procedures, section 7.14.

## Specific Information Regarding Local Activities

### Working in the Field Induction

UWA’s policy on working in remote locations and fieldwork can be found at:

http://www.safety.uwa.edu.au/policies/remote or <http://www.safety.uwa.edu.au/policies/field_work>

Before you commence any fieldwork or engage in activities off the University campus: metropolitan or remote, you should have;

* Fill in your field trip work plan 7 working days before your departure date and have it signed off by of the School Manager.
* Take a SPOT Device or satellite phone with you for better coverage than with a mobile phone
* Have an emergency contact person back in Perth
* Inform your emergency contact person of your daily field executions.
* Inform your emergency contact person, when you are leaving to go out to the field, a midday check in time and on your return to camp or upon arrival home.
* People working in remote areas must be qualified in first aid
* Have another field person with you (two or more people would be ideal, but a minimum one person could be considered at the discretion of the School Manager)
* Have basic training in 4WD handling and snake awareness (see below for information on snake safety in the field)
* Carry a fully stocked first aid kit and a snake bite kit (available from the First Aid Officer)
* Carry water
* Wear suitable clothing (including a hat) to avoid heat or low temperature stress
* Carry sun protection cream
* Carry rehydration salts and fluid
* Submit fieldwork expenses for reimbursement (keep all your expenditure till receipts for this reason)

Staff and students who go 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:

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.

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

#### School Responsibilities

The Head of School is ultimately responsible for ensuring:

**Administrative Arrangements:**

* 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 required to ensure adequate safety levels. <http://www.safety.uwa.edu.au/policies/field_work>
* 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.
* All participants must comply with all UWA and Plant Biology policies and procedures. Any person who deliberately expose themselves or others to risk by non-compliance are to be either counselled or if necessary excluded from field work.
* 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;
* All agreed daily call-in schedules. Notification to all local authorities as to your intend location, for how long and when you will contact them again.

**Transport:** An appropriate type of vehicle is to be utilised 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.

**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 for the field trip should be dictated by experience and common sense. Where requested, the School must provide the necessary items as part of their management and legal responsibility to provide a safe place 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 trigger a life-threatening situation. If anyone is taking regular prescribed medication it’s vital that adequate amount of medication is carried on the trip and is the responsibility of the individual person.

**First Aid Equipment:** Field work locations are still considered as university workplaces and are defined by Safety and Health legislation and as such, compliance with relevant regulations is still 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, 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 in 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.

**Being snake aware:** In some field work situations, encounters with snakes may be possible, we recommend that you heed to the following suggestions:

* 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

* Time
* Location
* Description of snake

### Vehicles

#### Using any School Vehicle

All drivers must be fully engaged with working for the University and hold a current licence recognisable by Australian licencing department and of appropriate drivers licence class for hire of the Plant Biology vehicles. The vehicles can be booked for a cost. Please check with the Receipting Officer prior to booking for charges. The hire rate charges covers fuel, insurance, general maintenance and replacement cost, it does not cover any damage caused by misuse. Damage caused through misuse of the vehicle, e.g. 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, e.g. 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 possibility of full replacement cost of a new vehicle.

Please make sure that you return the vehicle within the booked time period. Also return the vehicle in good working condition. If you find any faults, please report them immediately so they can be rectified. If you leave the car in a dirty condition, it will be professionally detailed and the cost charged to your project grant account. There is a car wash bay situated behind the combined workshop. The Plant Biology vehicles are located near the Combined Workshop building. The location of each vehicle is specified in the booking details. Keys are located in the Receipting Officer office. Use of University Vehicles Policy can be viewed at: <http://www.safety.uwa.edu.au/policies/use_of_university_vehicles>

Bookings can be made via the EZBook system, see the Receipting Officer for EZBook registration.

#### 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](http://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. Field plans for fieldwork must be submitted to the Head of School for approval, a minumin of 7 days prior to departure date and booking of the 4WD. The minimum size of a field party going off road is two people. Persons who are participating in fieldwork must be physically fit and have no pre existing medical conditions. No more than eight hours in a 24-hour period can be taken up with driving, regular rest periods are required. The Field plan leader /driver is totally responsible for all aspects of preparation, maintenance of the vehicle and equipment, the application and implementation of the guidelines out lined in the field plan. A check for roadworthiness of the vehicle and any towing equipment should be made prior to departure and daily for the duration of the trip. This check should include: tyres, radiator, oil levels, and battery condition. Regular call-in need to be schedules three times a day for all field trips involving off-road or remote location work.

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/use_of_university_vehicles>

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

####  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 Reciepting Officer.

#### Driving for Extended Periods or In Remote Areas

When driving under these conditions, the following should be observed:

* No more than 8 hours in a 24 hour period should be taken up with driving. The total time spent travelling, inclusive of breaks, should not exceed 10 hours, even when the driving is shared;
* A rest period of 20 minutes is required every 3 hour of driving. Where driving is shared, each driver shall drive for no longer than 3 hours;
* Ordinary duty (that does not involve driving) 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, should be reasonable in the circumstances and be planned in your field trip under risk assessment;

* Provision 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.
* Be realistic in regards to driving and nominate more than one field trip attendees with driving duties, especially where all or part of the journey is to be undertaken in isolated areas or under arduous climatic conditions.

#### 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 8 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 you are likely to encountered during the trip and making provision for them.
* Submitting a fieldwork plan 7 working days 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.

#### Recommended Equipment for Field Work in Remote Locations

|  |  |
| --- | --- |
| Essential Items | Remote Area Items |
| Vehicle Handbook  | Wheel chains |
| Maps and compass  | Jerry cans  |
| First-aid kit  | CB Radio or satellite phone  |
| Fire extinguisher  | Pick  |
| Knife (pocket or sheath)  | Radiator blind or tarpaulin  |
| Trouble lamp  | Flares  |
| Portable warning signs  | GPS  |
| Spot Device | EPIRB  |
| Spare wheels | Workshop manual  |
|  | Survival book  |
|  | Survival kit  |
| Miscellaneous Repair Items | Recovery Equipment |
| Aero start  | Duct or Gaffers tape  |
| Spare nuts, bolts, washers etc  | Self amalgamating tape  |
| Gasket cement  | Insulation tape  |
| PVC fuel hose  | High lift jack  |
| Contact cement  | Leather gloves  |
| Silicone adhesive  | Snatch strap  |
| Araldite, Plastibond etc.  | Rope  |
| Radiator stop leak  | Winch (including wire rope and handles)  |
| Fencing wire  | Shovel  |
| Dewatering fluid (eg CRC)  | Snatch block  |
|  | Axe  |
|  | Shackles  |
|  | Air Compressor |
| Tools | Lubricants etc |
| Wheel brace  | Engine oil  |
| Comprehensive tool kit (with all necessary size sockets and spanners)  | Transmission oil  |
| Jack (standard) and base plate  | Distilled water  |
| Jumper leads  | Water - enough to fill radiator in addition to drinking water  |

### Using the School Boat and Diving equipment

* 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 driver’s licence or diving ticket and a current medical certificate.

You must also have read the dive regulations found at http://www.safety.uwa.edu.au/topics/off-campus/boating-diving.

An oxy-viva kit is available for loan and must be taken when going on diving trips. Please cleaned the oxy-viva thoroughly with fresh water, dried it correctly and returned after every dive trip so it can be kept in good condition. Further information is available from the School Boating and Diving Officer. Costs for boat hire can be obtained from the receipting officer.

# RISK MANAGEMENT

For assistance in the decision making process (including ‘when’ and ‘if’ risk assessment is required), use the flowchart ‘Task and Activity Planning in a Safe system of Work’. Refer to Safety Management at: [www.safety.uwa.edu.au/safety\_management](http://www.safety.uwa.edu.au/safety_management). To ensure that activities are unlikely to cause harm it is necessary to be aware of what could possibly go wrong and what the consequences could be. You must then do whatever is ‘reasonably practicable’ to ensure that people are not harmed. This process is known as risk management and involves the four basic steps:

* Identify hazards – find out what could cause harm.
* Assess risks – understand the likelihood of a hazard causing harm and how serious it could be.
* Control risks – implement the most effective control measure that is reasonably practicable in the circumstances.
* Review control measures to ensure they are working as planned.

In the UWA Safe System of Work, risks are categorised as concentric shells. Each shell addresses a specific aspect of the task or activity as follows:

**ENVIRONMENT / SUBJECT:** This is the outer of three shells of risk.

An overall assessment is made and kept up-to-date as a valuable reference source by Safety & Health. It is known as the “UWA Safety & Health Risk Register”.

**RESOURCES:** This is the middle shell of risk.

Assessment of the use of resources can be prepared in advance of work activities. Hazardous plant and equipment can be assessed for use by creation of Standard Operating Procedures and assurance of worker competence through training and creation of supporting records. Hazards associated with chemicals and substances can be assessed through use of Material Safety Data Sheets and Chemical Risk Assessments.

**PROCESSES:** This is the inner shell of risk.

This is the part of a task which involves the work itself and the aspects which cannot be accounted for in advance. It only addresses previously unassessed hazards IF they are judged to be present in which case it is necessary to carry out Job Safety Analysis which involves writing a Method Statement and completing a Risk Assessment.

## Application of the UWA Safety and Health Risk Register

The UWA Safety and Health Risk Register lists all the relevant acts, regulations, standards, guidance notes and UWA procedures for reference. It considers hazards and risk in all the main areas and subject categories found at the University. Refer to [www.safety.uwa.edu.au/safety\_management](http://www.safety.uwa.edu.au/safety_management) page and open ‘UWA Safety and Health Risk Register’.

This document divides the main activities conducted at UWA or on behalf of UWA into categories. Each category lists the legislation which applies and the University’s response in the form of UWA Safety, Health and Wellbeing procedures and guidance. The existence and application of these documents collectively comprises our control measures for the minimisation of risk in each category. The perceived hazards are assessed as a RAW risk and then re-evaluated as RESIDUAL risk after accounting for the impact of the control measures when properly implemented. The risk rating process was carried out in accordance with the UWA Safety Risk Management Procedure.

The workplace is required to select the parts of this document which are applicable to its activities and create a Workplace Risk Register. Any additions which are not included in the central UWA Safety and Health Risk Register are to be forwarded to UWA Safety, Health and Wellbeing for inclusion. Notice of revisions will be communicated to ensure that the University remains informed and up-to-date.

## Assessing hazards associated with resources

Resources consist essentially of competent personnel, risk assessed use of plant/equipment and risk assessed interaction with chemicals/substances.

**Records of worker competency**

These must exist for individuals who operate potentially hazardous equipment to show that they are proven, via one or more of training, experience and qualifications, to be able to work safely in the environment and with the resources.

**Standard Operating Procedures (SOP) for hazardous equipment**

These are to be prepared for potentially hazardous equipment. This can save a lot of time in future as they are then available upon demand. In addition to their design acting as a risk assessment they also provide the option of using them as records of competency. It could be difficult to prove that personnel are competent and/or that they are qualified and trained without written records. Even if there are separate training records, preparing SOPs and having them on display in the workplace provides a useful reminder. Having prepared SOPs saves a great deal of time later, as the need to assess hazardous equipment via full risk assessments, for individual jobs, may be avoided. Work areas should develop a local library of SOPs. It may seem like a hurdle initially but it saves time and work later. Having SOPs for potentially hazardous equipment helps you in four ways:

* Signed and endorsed SOPs can be stored as documented proof of training and competency.
* They are to be displayed near equipment as a handy reminder for reference.
* They can be attached to a Safety Assessment form if one is needed for a task.
* Work Safe inspectors ask for proof that equipment and tasks have been risk assessed and that personnel working in the area are competent.

Assessment of hazardous chemicals or substances

It is a mandatory requirement to be in possession of a Material Data Safety Sheet (MSDS) and to complete a risk assessment relating to use of all hazardous chemicals or substances. **Hazardous chemical substances will not be ordered** via the Purchasing Officer unless a valid Chemical Risk Assessment (CRA) form has been submitted. This form has to be signed off by the person undertaking the work, their direct line supervisor and the Head of School (or delegate). Details on the CRA can be found at:

 http://www.safety.uwa.edu.au/topics/chemical/risk-assessment

Briefly, if a chemical to be ordered is classified as hazardous/dangerous and is to be used alone in accordance with the manufacturers intend use (ie not in conjunction with other chemicals) then a CRA can be completed using ChemAlert for a single chemical.

 (http://www.safety.uwa.edu.au/topics/chemical/chemalert).

However, when multiple hazardous/dangerous chemicals are used in a procedure then a ‘Chemical Process Safety Risk Assessment’ form must be completed which can be located at http://www.safety.uwa.edu.au/management/toolkit under the Job Safety Analysis section.

Sign off for both CRA is to be done by the person undertaking the CRA, their direct line supervisor and the Head of School or delegate.

For work with carcinogens, toxins and embryotoxins, cryogenics, herbicides/pesticides, peroxidizables, organic and shock sensitive, cyanides, acid fluoride chemicals and gas cylinders refer to the MSDS and the UWA Chemical Safety Procedures.

## Carrying out Job Safety Analysis (JSA)

Activities which call for Job Safety Analysis (i.e. Safety Risk Assessment + Method Statement) can be defined as those where you or others may be exposed to otherwise unassessed hazards. If you plan to work outside of your normal workplace or you intend to use potentially hazardous equipment, not covered by existing SOPs and training, then a JSA is required to risk assess and describe how the work is to be completed safely.

Risk assessments determine the level of hazard or risk associated with any procedure and assess whether current control methods are adequate or need to be improved. They must be performed when:

* It is the first time that a procedure is to be performed.
* There is only limited knowledge about a hazard or the risk or how the risk may result in injury or illness.
* There is uncertainty about whether all of the things that can go wrong have been found.
* The situation involves a number of different hazards that are part of the same work process or piece of plant and there is a lack of understanding about how hazards may impact on each other to produce new or greater risks.
* There is to be a significant change of procedure/practice since original assessment.

Tasks may be part of larger activities or there may be potential hazards in the area of work which are outside of your control. In such cases it is reasonable to expect that the person responsible for the area has identified the need to risk assess. In addition to potential hazards to you whilst working in their area, your task may impact on routine activities in ways which you are unable to account for. Before commencing tasks it is important that you communicate with the person responsible for the local area to enable proper control to be maintained.

In the “supplier / customer” relationship, it is the customer who carries responsibility for ensuring safe working in their area and for carrying out Job Safety Analysis although interaction with the “supplier” should occur to ensure proper understanding of all the implications of carrying out the task or activity. For example, consider the case of workshop personnel carrying out work in an area away from the workshop. Whilst the workshop supervisor was responsible for “supplying” workers who were competent to do the work, the supervisor for the area in which the activity is to occur is responsible for what happens in their area of control. As the “customer” they must consult with workshop personnel beforehand to determine if all the potential hazards have been accounted for and if necessary carry out further Job Safety Analysis.

Job Safety Analysis is used to account for otherwise unassessed hazards. It has two main components:

* Risk Assessment - assesses potential hazards and works out how to minimise risks.
* Method Statement - states what you plan to do and accounts for the risk control measures identified in the risk assessment. This is a useful document for describing tasks either as a one-off or regularly repeated tasks.

## Cases when Job Safety Analysis is not necessary

It is not always necessary to carry out detailed Job Safety Analysis for every task. It would be impractical and unrealistic to expect. However, it is important to be able to demonstrate that tasks and activities are appropriately considered. Many hazards and their associated risks are well known and have well established and accepted control measures. In these situations formal risk assessment is unnecessary. If, after identifying a hazard, you already know the risk and how to control it effectively, you can just implement the controls.

Job Safety Analysis is **not** necessary in the following situations:

* Legislation requires some hazards or risks to be controlled in a specific way – these requirements must be complied with; or
* A code of practice or other guidance sets out a way of controlling a hazard or risk that is applicable to your situation and you choose to use the recommended controls. In these instances, the guidance can simply be followed; or
* There are effective controls that are in widespread use in the particular industry, that are suited to the circumstances in your workplace. These controls can simply be implemented.

Many workplaces may proceed safely with day to day operations without further **Job Safety Analysis** if all of the following are true:

* **UWA Safety and Health Risk Register** addresses the work environment or subject; and
* **Standard Operating Procedures** are available for all hazardous equipment used; and
* **Records of competency** exist for individuals who operate potentially hazardous equipment.
* **Permission** to proceed has been given by the Supervisor of the area.

It may be appropriate to make a formal statement that after accounting for these (highlighted) contributing assessment processes there are no further identifiable, unassessed risks remaining.

In workplaces where this is true for routine operations (e.g. some workshops), it should only become necessary to carry out a Job Safety Analysis if the nature of the work is such as to introduce new factors which are not addressed as described above.

# RELATED DOCUMENTS

Flowchart – Task and Activity Planning in a Safe System of Work

Safety Risk Assessment form

Standard Operating Procedure

Method Statement

For all of above, refer to <http://www.safety.uwa.edu.au/management/toolkit>

Material Safety Data Sheets

Refer to <http://www.safety.uwa.edu.au/topics/chemical/chemalert>