

HEALTH AND SAFETY MANUAL

General Policy Statement on Health and Safety Management

The School of Physics Workshop fully endorses the Occupational Safety and Health policy of the University of Western Australia. This health and safety manual supplements the main UWA policy to provide and maintain safe and healthy working conditions, equipment and systems of work. To this end, information, instruction, training and supervision is provided as necessary. We will, so far as is reasonably practicable, ensure that no persons are put at risk from activities carried out under the auspices of the University.

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


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

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

This manual and associated health and safety systems will be kept up to date to take account of changes in local activities.

Reporting processes will be developed and maintained to ensure that relevant information is made available to the Health and Safety Committee, by which the area it is represented.

Endorsed by:

Name: Winthrop Professor - Ian McArthur Head of School of Physics	Signature  :	Date 14 th June 2011
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1 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 reasonably practicable to eliminate the risks then to minimise those 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 both generic and area specific information which together describes the means by which a Safe System of Work should be operated in the workplace.

2 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.

Refer to Appendix A .. (page 23)

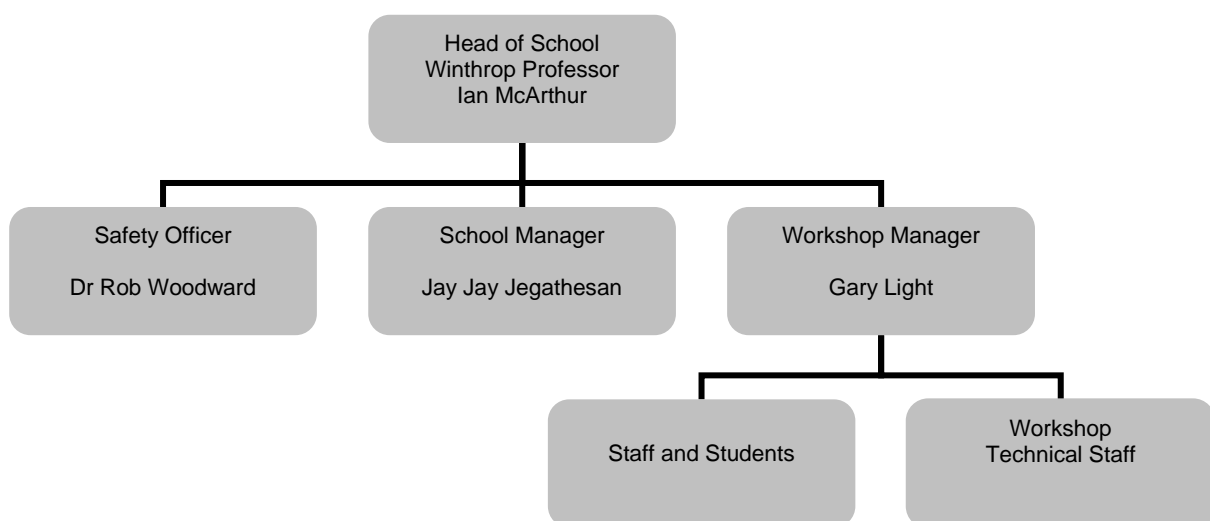
3 INTRODUCTION

Successful management of health and safety can only be effectively achieved when the participation of staff at all levels in the school 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 work area and which promotes self checking, review and continual improvement. It addresses the safety management in the work area, the use of resources and carrying out individual activities.

As part of individual duty-of-care, all individuals are encouraged to raise concerns about health and safety with appropriate managers or supervisors. If they are not able to put it right themselves they should immediately be escalated to ensure they are properly addressed. Also refer to www.safety.uwa.edu.au/policies/resolving_safety_&_health_issues

For routine health and safety matters the line of responsibility follows line management arrangements according to the following organisation chart.



In the management of health and safety there are defined roles of nominated individuals. They assist the senior manager and also report to the local H&S Committee. Definitions of these roles can be accessed via the RESPONSIBILITIES section of this manual.

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4 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 www.safety.uwa.edu.au/policies/safety_and_health_auditing

4.1 Legislation

4.1.1 The Occupational Safety and Health Act 1984

This is the principal legislation to which this manual relates.

Statutory Requirement:

"A health and safety representative for a workplace at which there are over 10 employees may request the employee to establish a Health and Safety Committee" - Section 36 OHSW Act 1984

"At least half of the members of the committee shall be Health and Safety Representatives or persons elected by the employees" - Section 38 OHSW Act 1984

4.2 Record Keeping

Adequate record keeping is important because the absence of such records may be treated 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 H&S 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 employs the AS/NZS 4801 Safety Auditing Standard as its means of monitoring safety performance in all areas.

Key documents required for examination by auditors are:

4.2.1 The UWA Safety and Health Risk Register

Refer to www.safety.uwa.edu.au/safety_management page and open "UWA Safety and Health Risk Register" *

4.2.2 This Health and Safety Manual

This manual should be the principal reference for safety management in the work area. *

4.2.3 Standard Operating Procedures

Combined safety assessments and training record documents describing the safe use of hazardous equipment. *

4.2.4 Evidence of competency and training

Either by qualification or by experience and well established demonstrated knowledge that individuals are able to use resources safely. *

4.2.5 A prescribed process for the planning of tasks and activities

A documented process for planning of otherwise unassessed activities which may or may not be such as to require documented description and specific risk assessment via a standardised process. **

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4.2.6 Evidence of use of monitoring

This includes area safety checklists, self-auditing and/or intra-University auditing to the adopted AS/NZS 4801 standard. **

4.2.7 Evidence of regular review

This includes Health and Safety Committee meetings, reporting and implementation of improvements. **

* assistance can be accessed via the UWA Safety and Health website by provision of pro-forma documents.

** sections of this manual are dedicated to these items

5 DEFINITION OF TERMS

Cryogenics

The production of low temperatures or the study of low-temperature phenomena.

Within the School of Physics this mostly refers to Liquid Nitrogen at atmospheric pressure, at -195°C (77.4 K) and Liquid Helium which exists at atmospheric pressure at temperatures below -268.95°C (4.2 K), and for temperatures near absolute zero at pressures up to about 25 atmospheres (2.53 megapascals); has two phases, helium I and helium II.

Resources

People, equipment and substances used within the work area.

Demonstrable competency

In some circumstances it is not possible or is difficult to verify formal qualifications, particularly when they were obtained many years previously. Demonstrated knowledge, skills, ability and experience can all be collectively considered as an alternative assessment of competency but must be recorded and filed for reference.

Standard Operating Procedure (SOP)

This is a document which is structured to risk assess, provide guidance in use and record user competency when operating potentially hazardous equipment. It consists of pre-operational checks, guidance for use, post-use guidance, potential hazards 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.

Hazardous substances

This includes chemicals which may be corrosive, known carcinogens or toxic. It also includes pathogens, solvents, gases and others.

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6 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 Officer, employees and students are available via the UWA Safety and Health website. Refer to http://www.safety.uwa.edu.au/policies/responsibility_and_accountability

6.1 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: <ul style="list-style-type: none">• manage or control a workplace• manage or control fixtures, fittings or plant at workplaces• design, manufacture, import, supply or install plant, substances or structures	Must ensure, so far as is reasonably practicable, that: <ul style="list-style-type: none">• the workplace, including entry and exit and anything arising from the workplace are without risks to health and safety• the fixtures, fittings or plant are without risks to health and safety• 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: <ul style="list-style-type: none">• acquire and keep up to date knowledge of work health and safety matters associated with the operations of the faculty or school• 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 implements processes 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

6.2 Health and Safety Committee

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 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 area.

It also assists in meeting their responsibilities as “Officers” by demonstrating due diligence.

Refer to section RESPONSIBILITIES; Duty of Care and Due Diligence

Faculties/Schools/Centres and Sections are required to address health and safety matters through effective Committees.

6.2.1 General Matters Concerning H&S Committees

- **The Dean, Head of School, Senior Manager / Senior Academic** shall occupy the office of Chairperson. A Deputy Chairperson shall be an employee Health and Safety Representative elected by the H&S Committee.
- **Staff representatives (academic, general)** shall be the **elected Health and Safety Representatives** where these have been appointed.
- **Faculty or Section representatives** shall so far as practicable have authority to act on behalf of the Vice-Chancellor.
- The Health and H&S Committee may appoint a “Minutes Secretary” to support and record their activities. This post may not hold voting rights.
- The Committee may invite other meeting attendees as observers without voting rights.
- Representation on the committee should reflect all functional areas and working groups within the workplace.
- The size of committees must be kept as small as practicable whilst not undermining full representation.
- The Committee is a representative consultative committee reporting to the Dean or Senior manager.
- Each Faculty or business unit should be represented by a H&S Committee which addresses issues of occupational health, safety, welfare and fire.

6.2.2 Terms of Reference

The Committee provides the principal Occupational Health and Safety consultative mechanism and central point of reference of the work area which it represents. Its principal activities are as follows:

- To facilitate cooperation between all persons working under the auspices of the University in developing, instigating and carrying out measures designed to optimise health and safety.
- To review and disseminate required standards, rules and procedures relating to health and safety which are to be complied with in this workplace.
- The Committee may appoint sub-committees as it may determine from time to time, to perform specific tasks on behalf of the Committee, the membership of which shall include at least one member of the Committee.
- The Committee receives reports from its members and sub-committees.
- The Committee may make recommendations or request attendance of delegations to the University H&S Committee by arrangement via Safety and Health.

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- To ensure that the safety related key documents described by this manual in the section “LEGAL REQUIREMENTS AND IMPLICATIONS; Record Keeping”, are made available.
- The Committee must meet at least quarterly.
- Meeting agendas and minutes must be made available for inspection.

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

6.2.3 Suggested Meetings Agenda

- Attendance/apologies
- Minutes of the previous meeting
- Matters arising/outstanding action items from previous minutes
- Minutes and reports received from sub-Committees
- hazards reported and actions arising
- incident/injuries and lost time follow ups
- workers' compensation support (as necessary)
- safety related training (including inductions)
- workplace inspections and follow ups
- implementation of University, Faculty and School safety related policies, procedures, and guidelines
- safety budgets and funding
- promotion of a workplace safety culture
- preparing for workplace audits and submitting for recognition of achievements (e.g. UWA Safety Awards)
- Review health and safety management plans and associated objectives and targets

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7 SAFE CONDUCT

This section summarises immutable University policies, procedures and guidance which apply throughout the University. Alterations may only be made via agreement with UWA Safety and Health.

7.1 Required standards of behaviour

The following recommendations meet the required standards of behaviour for all personnel present in the work area.

- Particularly in potentially hazardous areas such as workshops or laboratories, never adopt a casual attitude, reckless behaviour or run in the area.
- Always be conscious of the 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 workshops and laboratories. Similarly, loose clothing, singlets, tank tops or similar clothing are not suitable for wearing in the workshops or laboratories.
- Always wear eye protection when using power operated hand or machine tools, while performing physical tests that could lead to eye damage and whenever in an environment where hazardous substances are handled.
- Use protective clothing and devices appropriate to the type of work 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 work area.
- If planning to work in isolation refer to www.safety.uwa.edu.au/policies/isolation for guidance.
- Do not handle, store or consume food or drink in workshops or laboratories or any other area where local rules enforce the same.
- Do not smoke within any university building. Refer to <http://www.safety.uwa.edu.au/policies/smoking>
- Particularly in workshops and laboratories, regard all substances as hazardous unless there is definite information to the contrary and take additional care when carrying or moving them.
- Work may only be carried out with the permission of the 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.
- Only store food or drink in refrigerators which are intended for that use.

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- Warning signs and barriers appropriate to the work being carried out are to be displayed at entrances to the work area. If the work may be hazardous to other individuals then restricted access controls may be appropriate.
- Report all incidents, injuries (www.safety.uwa.edu.au/forms/incident) and hazards (www.safety.uwa.edu.au/about_safety_and_health/hazard_report_form) via the formal University reporting procedure.

7.2 No Smoking Policy

The University is committed to ensuring that its staff, students, contractors and visitors are not exposed to tobacco smoke in its workplaces including its building and vehicles. In the interest of having a healthy workforce, those who smoke are provided with assistance to quit smoking. Accordingly, managers and supervisors shall promote and ensure compliance with the No Smoking Policy.

7.3 Electrical Safety

Only electrical equipment, including all personal electrical equipment (*i.e. lamps, coffee percolators etc.*), that has been properly installed, maintained, inspected and has a current safety inspection tag fitted can be used within the work area. Items that do not have a current safety inspection tag **MUST NOT** be used. Everyone should routinely check that their electrical appliances are not damaged and that there are no obvious signs of misuse such as damaged or discoloured plug tops and worn cables. Any item that becomes faulty should be taken out of service, labelled and either discarded or sent for repair. Equipment should be positioned to avoid the need for leads to trail across floors. The use of socket adaptors is not allowed. Use of power-boards is permitted. Extension leads are seen as temporary measures to be used only until additional socket outlets have been provided. UWA equipment held off-site will be included in periodic inspections with the holder being responsible for bringing it into the University.

Electrical equipment in **hostile** work environments must be tested and tagged at appropriate intervals.

7.4 Purchasing

All materials and equipment acquired by the School 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 School may 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. To monitor that the requirements of the purchasing policy are being followed, only colleagues who are authorised signatories may approve acquisitions. Details of authorised individuals can be obtained from Financial Services.

7.5 Visitors and Contractors

Visitors or Contractors must report to the relevant unit office. The member of the unit who the visitor or contractor wishes to see will be telephoned from the office and asked to report and meet their visitor or contractor and accompany them in the unit. Failure on the part of contractors to report their presence undermines the ability of the University to maintain a safe working environment for them.

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 may be found on the UWA Safety and Health website: www.safety.uwa.edu.au/policies/visitor_safety

7.6 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 work area. The University has a health and safety policy for contractors, which requires that safety is managed through cooperation between the stakeholders. Ultimately, the University is responsible for all persons working on its property and must therefore verify that safety management is satisfactory.

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7.7 General Office Safety

A copy of the 'Computer Workstation and Office Safety Checklist' is available from UWA Safety and Health; individuals should use this to check the safety of their own office area.

The maintenance of high standards of general housekeeping in offices will help to prevent injuries. Particular attention should be given to the condition of floors, trailing leads and storage of items. Rubbish should be removed daily and floors kept in a neat and tidy condition.

For further information regarding Computer Workstation and Office Safety Checklist and to view the checklist refer to the UWA Safety and Health website:

www.safety.uwa.edu.au/forms/computer_workstation_and_office_safety_checklist

7.8 Safety off University Premises

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

7.9 Use of Computer Workstations

Refer to the brochure "Working Comfortably with Computers" and note that the same principles of adopting correct posture at a computer workstation applies to laptops as well as desk based computer monitors. Be aware that if you are working from home, you should also apply the same principles. For further information regarding computer workstation ergonomics refer to the UWA Safety and Health website: www.safety.uwa.edu.au/policies/computer_workstation_ergonomics

7.10 Children

If, under exceptional circumstances, 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 or any other area where the person in charge considers it to be inappropriate.

For more information regarding the UWA Policy on Children in the Workplace, including rights and responsibilities of parents refer to the UWA Human Resources Policies and Procedures website: www.hr.uwa.edu.au/policy/toc/appointment_and_employment/equal_opportunity/children_in_the_workplace/responsibilities_of_parents

7.11 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 any hazards that can impact on safely working in their area *e.g. check whether the area is cluttered, whether there is adequate lighting and whether any trip hazards are present.*

All workers must be aware of the hazards of repetitive work such as keyboard use or laboratory work and occupational overuse. They must take regular breaks to avoid muscular strain and report symptoms to their supervisor.

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 may implement control strategies such as the provision of mechanical solutions and/or training. An example would be moving and relocating offices. Many injuries occur when workers undertake unfamiliar or non-routine tasks due to a lack of planning or risk assessment.

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Where possible, mechanical handling equipment should be used (*e.g. trolleys and fork lifts*). Use ladders or steps to reach heights. Do not stand on boxes, chairs or other unsuitable items which are not intended for that purpose. Store all items in their correct location. Do not store items in front of emergency exits or in doorways. Do not store items in corridors, walkways or in front of electrical cabinets.

If manual handling tasks cannot be addressed as above then it may be necessary to carry out a Manual Task Risk Assessment.

All areas should develop and document a Manual Task Risk Management Plan. This must be done in consultation with staff and Health and Safety Representatives. The Occupational Therapists in UWA Safety and Health can assist with the development of these plans. Contact 6488 3938.

All staff and students in School of Physics are requested to consult a member of the Manual Handling Reference Group to seek advice and help before undertaking any tasks that may require Manual Handling. To reduce the risk of manual handling injury in the School of Physics a detailed manual handling risk management plan was developed. The following staff members, trained in a Back Care and Manual Handling course conducted by the University have been identified as the Manual Handling Reference Group Members. See below

Gary Light	Workshop - Room B-10	2753
John Moore	Workshop – Room B-06	2005
Lance Maschmedt	Atrium - Room G-31	2752 or 5024
Stephen Key	Workshop - Room B-10	2753
Craig Grimm	Workshop - Room B-10	2753

All staff, Honours and Postgraduate students are advised to discuss their Manual Handling training needs with their supervisors. Assistance with manual handling risk assessment and training in manual handling technique is provided by the Safety and Health Office. Staff are encouraged to phone if they have concerns. Contact 6488 3938.

7.12 Hazardous Chemicals and 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 Chemical Safety Procedures.

Clearly label all containers in use within the working area.

Use safety carriers for transporting 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 done in a spark proof refrigerator or freezer*).

Segregate and store all Dangerous Goods according to class.

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*). 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 should not be disposed of via sinks, drains or stormwater channels unless using neutralisation processes approved by the WA Water Corporation.

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8 LOCAL RULES

Key aspects of working in the area are included below. Additional information may be included but the fundamental requirements shown below should be left intact unless altered via agreement with UWA Safety and Health.

The *model Work Health and Safety Act (due for publication January 2012)* requires that consultation regarding health and safety matters occurs, as far as is reasonably practicable, with workers who carry out tasks and activities. If the workers are represented by a Health and Safety Representative, the consultation must involve that representative.

8.1 Management and Permission to work in the area

Managers and supervisors have control of and are responsible for, work areas and are authorised to give permission to do work on behalf of the University. Permission to carry out work in an area may only be granted to individuals who are competent to do so where records of that competence exist and are available for inspection. A combination of endorsement of documented methods, appropriate supervision 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 are able to meet the following criteria:

- They have received appropriate information, industry induction, instructions and training.
- They have the necessary qualifications and/or the necessary knowledge, skills, ability and experience as appropriate.
- They are fit for duty and competent to safely carry out the task.

The required level of supervision must be established and reviewed on a case by case basis.

8.2 Safety Induction as a pre-requisite to working in the area

All persons working in the area must have been safety inducted, may only carry out work using resources which they are deemed competent to use and may do so only with permission of the area Supervisor. A fundamental aspect of induction is to gain an understanding of and to acknowledge local rules. These include instructions relating to safe management of the area, access restrictions and conditions of use such as how the area is to be left upon completion of work. Upon completion of induction, a record must be made that it has been carried out. This is to be included in the individual's training records.

8.3 Competency and Training

Hazardous equipment may 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 should be identified by managers and supervisors and all requests for such training should be escalated via the organisation chart shown in the INTRODUCTION section of this manual. Individuals will not be expected to undertake any activities for which they are not deemed competent.

8.4 Cryogenics

Any person handling cryogenic fluids should be fully trained in the safety techniques to be used and should be aware of the potential hazards that may occur and how to avoid them. Full instructions are contained in the Safety and Health Office Laboratory Safety Course Notes, a copy of which is available from the Admin Officer, or from the Cryogenics Laboratory. Staff and students are strongly encouraged to attend the Laboratory Safety Course.

No-one is permitted to handle cryogenic fluids without permission and instruction from Liquid Gases personnel or the Workshop Manager.

- Always wear protective clothing, safety glasses, and or face shields, enclosed footwear, lab coats and suitable gloves (*depending on the process, cotton gloves are sometimes unsuitable as they allow the liquid to be retained next to the skin causing burns*)

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- Work in a well ventilated area. Nitrogen can displace the oxygen in the air without any noticeable effect (*Nitrogen is compatible with lung tissue*)
- Never transport LN2 in an enclosed motor vehicle, a spill of as little as 5 litres can displace the air in the compartment of a passenger vehicle, and in the event of an accident any spillage can cause severe low temperature burns (-196°C)
- Liquid Helium and Nitrogen dewars must only be transported in unattended lifts. Isolation keys for the lifts are available from the Cryogenic laboratory.
- Caps must be on 25 litre dewars, all valves must be shut on 180 / 200 litre dewars when being moved within the building
- Care must be taken with 180/200 L dewars to prevent toppling over, only push or pull with handle
- Do NOT allow dewars to over pressurise
- Report any condensation on exterior of dewars to Cryogenics laboratory staff
- If using domestic Vacuum flasks do not screw lid on

8.5 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 accidents involving gas cylinders occur while moving them from one location to another. The following control measures should be used to reduce the potential for an accident:

- 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.
- A requirement that only properly trained personnel are permitted to move cylinders.
- Use properly designed lifting equipment for the movement of larger gas cylinders.

Storage of gas cylinders

The guidelines for the storage are detailed for reference in Australian Standard AS 4332 -The Storage and Handling of Gases in Cylinders. The following precautions shall be observed for minor storage and handling of gas cylinders (*minor is formally defined – contact UWA Safety and Health for advice*)

- Gas cylinders are to be kept away from artificial sources of heat, i.e. radiators, boilers or steam pipes.

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- 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 1m 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 keeping of gas cylinders shall incorporate a risk management approach.

8.6 General Rules for Workshops and Laboratories

- SAFETY GLASSES MUST BE WORN
- HEARING PROTECTION SHOULD BE WORN WHEN USING NOISY MACHINERY
- CLOSED RIGID CAP FOOTWEAR MUST BE WORN IN WORKSHOP
- CLOSED FOOTWEAR MUST BE WORN IN LABORATORIES
- 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 ARE AVAILABLE IN FIRST AID BOXES.
- WASH HANDS AND REMOVE LAB COATS BEFORE LEAVING THE LABORATORY
- USE DISINFECTANTS AFTER HANDLING SUSPECTED INFECTIOUS MATERIALS
- REMOVABLE MACHINE GUARDING TO BE USED WHEN DEEMED NECESSARY
- 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

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

8.7 Housekeeping

General tidiness helps to ensure that work area resources are maintained and available for safe use as required. General tidiness includes such considerations as:

- Keeping floors tidy and dry.

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- Proper storage of heavy/awkward material or equipment stored between knee and shoulder height.
- Benches or work surfaces to be kept clean and free from chemicals and apparatus that are not being used.
- Keep the interior of fume cupboards and nearby areas clean and clear.
- Aisles and exits are to be kept free from obstructions.
- Bottles and glassware are to be kept off the floor.
- Access to all emergency equipment (*fire extinguishers, first aid kits*) is to be kept free from obstruction.
- Work areas and equipment are to be cleaned after use.
- If last to leave the work area, make sure all equipment is turned off.
- If contractors are working in your area, make known to them any hazards that may exist. *i.e. flammable liquids, dusts, combustible material*
- Cleaners will normally only sweep or mop floors and empty general waste bins of laboratories – avoid exposing them to hazards.

8.8 Working Alone

Individuals may occasionally be required to work alone on University premises. In all of the following cases, working alone is not permitted. Refer to <http://safety.uwa.edu.au/policies/isolation>

- Work which is remote or isolated from the assistance of others because the location nature or time; or
- Operation or maintenance of equipment or the handling of a hazardous substance; or
- Work which is dangerous for a person to perform alone.

Working alone is only permissible under the following circumstances:

- Staff and students may work alone in office environments; however, they must have obtained an endorsed after hours access permission form.
- Staff and students must not work alone in workshops where medium to high risk equipment is to be used.
- Emergency assistance – a means of communication to gain assistance in an emergency is available.

8.9 After-Hours Access

It is important that the Working Alone guidelines and Risk Management Guidelines be followed at all times. During normal working hours technical staff will be available to monitor activities in the area.

Access outside of normal working hours requires formal permission from a Manager or Supervisor.

It is a general rule that undergraduate students DO NOT have after-hours access. Undergraduate students requiring after hours access for a specific time or a specific purpose must formally apply to the Dean. Research Students requiring after-hours access must also have formal approval to do so. Before being approved by the Dean, the Supervisor must have given approval.

If formal permission has not been granted you may not work after hours.

In general, if working after hours:

- Ensure that the doors of buildings are securely closed and locked after entering and leaving the building.

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- Ensure that the doors to internal areas are secured on leaving.
- Ensure that you are familiar with the safety rules and emergency contact numbers displayed in the work area.
- Report to University Security any breaches of security or suspicious behaviour.
- Do not give anyone else security codes, keys or access cards.
- Do not provide access to buildings to unauthorised persons.

No equipment may be operated unless:

- Two persons are present.
- The operator is deemed to be competent to carry out the activity with supporting documentary evidence on file.
- Permission to use the resources.

A breach of any of these conditions will result in after-hours access being immediately cancelled. Any future request for after-hours access will require personal consultation with the Dean.

8.10 Emergencies, Incidents and Injuries

8.10.1 Emergency contact telephone numbers

- Fire brigade, Ambulance, Police 6488 2222 (24 Hours)
- Safety Officer John Moore - 0404 740 809
- Hospital (Casualty) SCG – 9346 3333
- University Security 3020
- First Aiders Dave McPhee - 3480
- First Aid box location Room B-11

Refer to UWA Safety and Health webpage - http://www.safety.uwa.edu.au/incidents_and_emergency

Ensure all incidents and injuries are reported to Supervisors and on a UWA Confidential Incident/Injury report form depending upon the severity of the injury.

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.

8.10.2 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 Security - who then notifies other emergency personnel.

Phone Security on 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 using the correct fire extinguisher. Do not use water or foam on an electrical fire.

Fire Extinguishers - This equipment is provided to extinguish minor fires only. If there is any risk from the fire the building should be evacuated. Before using a fire extinguisher read the instructions ensuring that it is appropriate to the type of fire.

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- *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 -It should be noted that this extinguisher can be safely used on all types of fires, however when gas dissipates re-ignition can take place.
- *Dry Powder Extinguisher (colour coded red with a white band)* - For use on electrical and flammable gases also flammable liquid fires.

Evacuate - the building as instructed to do so by a Warden. Walk 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 the ECO or Fire and Rescue Services personnel.

8.11 Roof Top Safety

There have been several incidents in the past regarding the 5th floor external roof-space. If in this area please observe the following. DO NOT ..

- Sit on parapet
- Place any objects on parapet
- Throw any objects from parapet

8.12 Safety Personnel

DESIGNATION	NAME	
Head of School	Dr Ian McArthur	Ext 2737
School Safety Officer	Dr Robert Woodward	Ext 2751
Safety and Health Representative	Mr. John Moore	Ext 2005
Building Fire Warden	Mr. John Moore	Ext 2005
Fire Warden – Area	Various (See School Safety Manual)	
First Aid Officer	Mr. Lance Maschmedt	Ext 2752
Biological Safety Officer	Dr Tim St Pierre	Ext 2747
Hydrofluoric Acid Safety Officer	Dr Ju Li	Ext 1033
Laser Safety Officer	Dr Andre Luiten	Ext 2751
Radiation Safety Officer	Dr Robert Woodward	Ext 2751
Postgraduate Student Representative	Paul Gualiaro	Ext 3479
Gingin Safety Officer	Ju Li	Ext 1033
Rio Tinto Representative	Grant Walker	Ext 4768
Renu Sharma	ICRAR Representative	Ext 7871
Teaching Representative	Lance Maschmedt	Ext 2752

9 RISK MANAGEMENT

It is not necessary to complete a risk assessment when a hazard is well known and the solution is obvious - simply make the workplace safe.

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. We 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.

Risks are categorised into manageable chunks (or shells)

Each shell addresses a specific aspect of the task or activity.

ENVIRONMENT / SUBJECT: This is an overall assessment which is made available by Safety & Health. This is known as the "UWA Safety & Health Risk Register".

RESOURCES: Records demonstrating worker competency, Risk Assessment and instruction in use of hazardous equipment, chemicals or substances. These can all be prepared in advance and made available for future reference in the form of Standard Operating Procedures or by obtaining Material Safety Data Sheets.

PROCESSES: This is the part of a task which involves all the aspects which cannot be accounted for in advance. It only addresses unassessed hazards/risks IF they are judged to be present. In this case it is necessary to carry out Job Safety Analysis (*writing a Method Statement and completing a Risk Assessment*)

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

9.1 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 UWA. Refer to 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 and Health 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 implemented. The risk rating process was carried out in accordance with the UWA Safety Risk Management Procedure.

9.2 Assessing hazards associated with resources

Resources consist essentially of competent personnel, equipment used and substances.

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Records of 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 (SOPs)

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 may 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 work area will provide 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 (*see the flowchart "Task and Activity Planning in a Safe system of Work"*). Work areas should develop a local library of SOPs. It may seem like a hurdle initially but it will save 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.
- WorkSafe inspectors will ask for proof that equipment and tasks have been risk assessed and that personnel working in the area are competent.

Hazardous Chemicals and Substances

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 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 Chemical Safety Procedures.

9.3 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 work area or you intend to use potentially hazardous equipment not covered by existing SOPs and training then a JSA will be required to risk assess and describe how it will 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 should 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.

In research and educational environments documented risk assessments should be completed for the following:

- Laboratory projects – work is not to commence until a written risk assessment has been completed by you and your supervisor. It is to be signed off and recorded.

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- All hazardous chemicals to be used must be accounted for.

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. It is reasonable to suppose that as the “customer” they will work with the workshop personnel beforehand to determine if all the potential hazards have been accounted for and if necessary carry out further Job Safety Analysis.

JSA 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.

To assist the decision making process (*including which type of risk assessment is required*) when planning activities or tasks refer to the flowchart “Task and Activity Planning in a Safe system of Work”. Refer to Safety Management at:

www.safety.uwa.edu.au/safety_management

9.4 Work places where further JSA is not required

It is not always necessary to produce 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 risks are assessed appropriately. Many work areas 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 work areas 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.

9.5 Cases where a risk assessment is unnecessary

Many hazards and their associated risks are well known and have well established and accepted control measures. In these situations, the second step to formally assess the risk is unnecessary. If, after identifying a hazard, you already know the risk and how to control it effectively, you can just implement the controls.

Risk assessment is **not** necessary in the following situations:

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- 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.

10 REFERENCES

Physic workshop

<http://www.physics.uwa.edu.au/staff/safety/personel/duty-statement>

<http://www.physics.uwa.edu.au/staff/induction>

<http://www.physics.uwa.edu.au/staff/workshop>

Health & Safety in Engineering Workshops

<http://www.hse.gov.uk/pubns/hsg129.pdf>

Gas cylinder safety

<http://www.uq.edu.au/ohs/pdfs/OHYG-BOCGasCylinderSafety.pdf>

Cryogenic safety

http://www.boconline.co.uk/pdf_downloads/health_and_safety/gas_safety/care_cryogenics.pdf

Forklift safety

http://www.commerce.wa.gov.au/worksafe/PDF/Guidance_notes/Working%20safely%20with%20forklifts.pdf

Chemical safety

http://www.flinnsci.com/sections/safety/chemicalSafety/L1040-1041_HS_LAB_SAFETY_ART.pdf

Occupational Safety and Health Act 1984 (WA)

http://www.slp.wa.gov.au/legislation/agency.nsf/docep_main_mrtile_650_homepage.html

Occupational Safety and Health Regulations 1996

http://www.slp.wa.gov.au/legislation/agency.nsf/docep_main_mrtile_1853_homepage.html

AS/NZS 4801 Safety Auditing

<http://www.ncsi.com.au/downloads/S002.pdf>

AS/NZS ISO 31000:2009 Risk Management - Principles and Guidelines

11 RELATED DOCUMENTS

Safety Risk Assessment form

Standard Operating Procedure

Method Statement

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12 APPENDIX A – DECLARATION

I have completed the required induction for the School of Physics Workshop.

I have read and understand this safety manual and I agree to:

- Work according to its contents.
- I will follow all the guidelines set out in the Health and Safety Manual.
- I will only operate equipment for which records of my competency exist.
- I will only carry out activities/tasks with permission from the supervisor of the area where the activities will be carried out.

Student / Staff Name:	Student/Staff Number:
Student/Staff Signature:	Date:

Trainer's Name: John Moore	
Trainer's Signature:	Date:

Supervisor's Name: Gary Light	
Supervisor's Signature:	Date:

To be signed, copied and included in individual training records