Chemical Management Plan

Curtin University

CONTENTS

TABLES

DEFINITIONS

Name	Definition
ADG Code	The Australian Code for the Transport of Dangerous Goods by Road or Rail ('Australian Dangerous Goods Code') 7th Edition.
Bulk storage	Storage of liquids, such as petroleum products in tanks as distinguished from drum or packaged storage
ChemAlert Authorised Users	Curtin staff who have been provided with write access to the ChemAlert system by the ChemAlert Administrator.
ChemAlert	An electronic Safety Data Sheet (SDS) repository and chemical inventory management system that aids Curtin University to meet its chemical regulatory requirements.
Chemical	Term used to define chemical substances, including Dangerous Goods, Hazardous Substances as well as substances that do not fall into either classification. They may be solids, liquids or gases; they may be pure substances or mixtures.
Class	Class of dangerous goods, means the number assigned to the goods in the ADG Code indicating the hazard, or most predominant hazard, exhibited by the goods.
Container	Means anything in or by which a hazardous chemical is, or has been, wholly or partly covered, enclosed or packed, including anything necessary to perform its function as a container.
Controlled Substances	Controlled Substances is a classification of pharmaceuticals and poisons that require licensing. Under the license conditions there are restrictions on access, labelling and use. Restrictions are determined by the Drugs, Poisons and Controlled Substances Regulations 2006 Scheduled Poison – means any medicine, drug or toxic chemical scheduled under the Poisons Act 1964 and associated regulations, for the purpose of protecting the public from harm.
Correct classification	Means the set of hazard classes and hazard categories assigned to a hazardous chemical when it is correctly classified.
Dangerous Goods	Dangerous Goods are solids, liquids or gases, which have been classified as dangerous under the Australian Code for the Transport of Dangerous Goods by Road or Rail, 7th Edition (ADG Code 7). Due to their physical properties that have the immediate potential to harm people, property or the environment.
Division	Division of dangerous goods, means a number, in a class of dangerous goods, to which the dangerous goods are assigned in the ADG Code.
Exposure standard	Exposure standard represents the airborne concentration of a particular substance or mixture that must not be exceeded. The exposure standard can be of three forms: • 8-hour time-weighted average • peak limitation • short term exposure limit.
GHS	Means the 'Globally Harmonized System of Classification and Labelling of Chemicals, 3rd Revised Edition', published by the United Nations as modified under Schedule 6 of the WHS Regulations.
Hazardous substance	Is a substance that has the potential to cause acute or chronic health effects as listed in the List of Designated Hazardous Substances [NOHSC:10005 (1999)]
Hazardous Chemical	A substance that has the potential to cause acute or chronic health effects, damage to property or environment.
Hazard	Means a situation or thing that has the potential to harm people, property or the environment. The GHS covers physicochemical, health and environmental hazards for hazardous chemicals.

Hazard category	Means a division of criteria within a hazard class in the GHS.
Hazard class	Means the nature of a physical, health or environmental hazard under the GHS. Note: This includes dangerous goods.
Hazard pictogram	Means a graphical composition, including a symbol plus other graphical elements, that is assigned in the GHS to a hazard class or hazard category.
Hazard statement	Means a statement assigned in the GHS to a hazard class or hazard category describing the nature of the hazards of a hazardous chemical including, if appropriate, the degree of hazard.
Hazchem Code	Means 'Hazchem Code' under the ADG Code. Also known as the Emergency Action Code.
HSEM	Curtin University's Health, Safety and Emergency Management Department.
Label	Means written, printed or graphical information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the container of a hazardous chemical.
Laboratory	Means a building or room equipped for analysis, genuine research or practical teaching, and which is not used for production purposes.
Manufacture	Includes the activities of packing, repacking, formulating, blending, mixing, making, remaking and synthesizing of the chemical.
Mixture	Means a combination of, or a solution composed of, two or more substances that do not react with each other.
Placard	means a sign or notice: a) displayed or intended for display in a prominent place, or next to a container or storage area for hazardous chemicals at a workplace b) that contains information about the hazardous chemical stored in the container or storage area.
Placard quantity	Means the quantity referred to in Schedule 11 of the WHS Regulations, table 11.1, and column 4 for that hazardous chemical. Note: This schedule has been replicated in Appendix D of this Code.
PPE	Personal protective equipment
Product identifier	Means the name or number used to identify a product on a label or in a safety data sheet.
Regulated Waste	Includes trackable waste and means non-domestic waste mentioned in Hazardous Waste Data Assessment (Department of Sustainability, Environment, Water, Population and Communities April 2013) (whether or not it has been treated or immobilised), and includes: for an element – any chemical compound containing the element; and anything that has contained the waste.
Research chemical	Means a substance or mixture that is manufactured in a laboratory for genuine research and is not for use or supply for a purpose other than analysis or genuine research.
Risk	The likelihood that a substance will cause harm in the circumstances of its use.
Safety Data Sheet (SDS)	A document prepared by a manufacturer or importer of chemicals, which describes the use, chemical and physical properties, health hazard information, precautions for use, safe handling information and the emergency information.
Substance	means a chemical element or compound in its natural state or obtained or generated by a process: • including any additive necessary to preserve the stability of the element or compound and any impurities deriving from the process, but • excluding any solvent that may be separated without affecting the stability of the element or compound, or changing its composition.

SUSMP	Means the Standard for the Uniform Scheduling of Medicines and Poisons, published by the National Drugs and Poisons Schedule Committee as amended from time to time.
Spillage	The loss containment. An uncontrolled release of a substance outside its container.
Transfer	Includes the pumping, dispensing or decanting from one container into another or from one place to another.

1 INTRODUCTION

1.1 Purpose

The purpose of this document is to outline aspects associated with the management of chemicals at all Curtin University sites. This includes purchasing, safe use, storage, management, transportation and disposal of chemicals. There may be other standards and legislation in addition to those outlined in this document that may need to be considered as applicable.

1.2 Aim

The aim of this document is to outline Curtin University's process and expectations for managing chemicals and their associated risks to ensure:

- that arrangements are in place to minimise the risk of adverse health effects and protect the safety of staff, students, contractors and members of the public, due to exposure to hazardous substances and dangerous goods;
- the mitigation of adverse environmental impacts; and
- compliance with State and Commonwealth regulatory requirements.

1.3 Scope

This document applies to all Curtin University staff, students and contractors who are required to use chemicals and/or controlled substances within the scope of their duties at Curtin University.

The Chemical Management System is intended for the use of chemicals such as, but not limited to, hazardous substances/chemicals, dangerous goods and otherwise controlled substances. The general legislative requirements for hazardous substances and dangerous goods will be outlined in the first portion of the document. The later portion will cover other controlled substances which require additional specific controls (See section 2.4).

This document should be used in conjunction with other Curtin documentation and procedures surrounding the management of chemicals (including specific area safety management plans, area and task specific risk assessments and standard operating procedures). This document has been developed in line with legislation and guidance that were current at the time of writing. New legislation and guidelines developed since the authoring of this document must be considered.

1.4 Not included in this plan

The following is not included as part of this plan:

- Class 1 Dangerous goods (Explosives)
- Biological safety (Biological Materials and Genetically Modified Organisms)
- The built environment - Asbestos, natural mineral fibres (NMF), CFC's
- Bulk storage of petroleum fuels (including underground storage tanks)
- Chemicals stored in Offices & Tea prep areas.

For each of these topics please see alternative guidance document or advice ensure appropriate risk assessment and ***safety documentation*** are completed, reviewed and approved.

1.5 Responsibilities

All staff, students and contractors who purchase, use, store or dispose of chemicals or controlled substances on behalf of Curtin University are required to undertake their responsibilities in line with the Health and Safety Responsibilities Procedures. For more detail on the Health and Safety Responsibilities within Curtin University, including individual performance criteria for each responsible party, please see the full procedure.

Table 1 provides a summary of the main roles and responsibilities for chemical management across the Curtin campus. Specific responsibilities will also be outlined in each subsection where applicable.

Table 1: Main Roles, Responsibilities and Authorities related to chemical management.

Role	Responsibility for health and safety (from H&S Responsibilities Procedures)	Responsibility for chemical management	Authority
Heads of Schools/Area Managers	To implement and maintain an effective health and safety system within the School or Area that is consistent with the Occupational Safety & Health Act 1984 and other legislative requirements.	To implement and maintain an effective chemical management system within the School or Area that is consistent with the Occupational Safety & Health Act 1984 and other legislative requirements.	Allocate responsibility for health & safety management and delegation of authority. (Including chemical management)

Managers/Supervisors	To undertake effective health and safety measures to ensure compliance with the Occupational Safety & Health Act 1984 and other legislative requirements.	To undertake effective chemical management measures to ensure compliance with the Occupational Safety & Health Act 1984 and other legislative requirements.

Individual workers/students	To comply with the Occupational Safety & Health Act 1984 and all reasonable directive given in relation to health and safety at work, to ensure compliance with University and Legislative health and safety requirements.	To comply with the Occupational Safety & Health Act 1984 and all reasonable directive given in relation to chemical management at work, to ensure compliance with University and Legislative health and safety requirements.	
Health, Safety and Emergency Management Department	To provide specialist advice and support to areas in relation to Hazardous Substances, Dangerous Goods, Regulated Chemical Waste Disposal and Controlled Substances. Co-ordinating and administering the Curtin University ChemAlert Database To provide specialist advice and support for the planning of emergency procedures To co-ordinate any communication between Curtin and emergency authorities for the purpose of planning	Maintaining the Chemical Management System and related Guidelines. To ensure emergency planning is undertaken	Yes – Can authorise the issue of guideline and management documents

Hazardous Substance Advisor (Office of Research and Development)	To provide advice and guidance on the appropriate management and storage of poisons Aid communication and coordinate with relevant authorities on Curtin's management of poisons.	Maintaining the Poisons Act Compliance Management Plan and related Guidelines	Advisory
University Chemical Safety Committee	To provide advice to the University on matters relating to chemical safety		Advisory
Curtin Properties	To provide advice to the University on matters relating to the compliance of Curtin facilities in which chemicals are used.	Undertake assessments and provide advice regarding the compliance requirements of facilities where chemicals are used or stored.	Yes
Radiation Safety Advisor (Office of Research and Development)	To provide advice and guidance on the appropriate management and storage of radioactive chemicals Aid communication and coordinate with relevant authorities on Curtin's management of radioactive chemicals	Maintaining the Radiation Safety Compliance Management Plan and related Guidelines	Yes – authorises use of radioactive chemicals

2 LEGISLATION & LICENSING

2.1 Acts & Regulations

The State and Commonwealth legislation that governs the use, storage, handling and disposal of chemicals is complex and considerable. The following list represents the Acts and Regulations that may be applicable to Curtin University They can be accessed by the following websites.

2.1.1 WA State Law http://www.slp.wa.gov.au/Index.html

- Occupational Safety and Health Act (1984)
- Occupational Safety and Health Regulations (1996)
- Dangerous Goods Safety Act (2004)
- Dangerous Goods Safety (General) Regulations (2007)
- Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations (2007)
- Dangerous Goods Safety (Security Risk Substances) Regulations (2007)
- Poisons Act (1964)
- Poisons Regulations (1965)
- Agricultural and Veterinary Chemicals Act (1995)
- Environmental Protection Act (1986)
- Environmental Protection (Controlled Waste) Regulations (2004)
- Health (Drugs and Allied Substances) Regulations (1961)
- Misuse of Drugs Act (1981)
- Misuse of Drugs Regulations (1982)
- Radiation Safety Act (1975)
- Radiation Safety (General) Regulations (1983)

2.1.2 Commonwealth Law http://www.comlaw.gov.au

- Chemical Weapons (Prohibition) Act (1994)
- Chemical Weapons (Prohibition) Regulations (1997)
- Industrial Chemical (Notification and Assessment) Act (1989)
- Agricultural and Veterinary Chemicals Code Act (1994)
- Agricultural and Veterinary Chemicals Code Regulations (1995)
- Customs Act (1901)
- Defence Trade Controls Act (2012)
- Excise Act (1901)
- Excise Regulations (1925)
- Therapeutic Goods Act (1989)

The legislation listed above has also been included in each of the relevant chemical classification sections.

2.2 National & International Guidance Materials, Standards and Codes of Practise.

There is an extensive list of Standards, Codes and Guidance Materials relevant to the management of chemicals at Curtin University. These include:

- GHS Hazardous Chemical Information List
- Australian Dangerous Goods Code [Edition 7.3 (2014)]
- International Air Transport Association (IATA) Dangerous Goods Regulations
- Standard for the Uniform Scheduling of Medicines and Poisons No 8. (SUSMP)
- Labelling of Workplace Hazardous Chemicals Code of Practice (2015, WHS)
- Workplace Exposure Standards for Airborne Contaminants (2013, WHS)
- Guidance on the Interpretation of Workplace Exposure Standards for Airborne Contaminants (2013, WHS)
- Storage and Handling of Dangerous Goods Code of Practice.
- Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)]
- Hazardous Substances Information Systems (HSIS)
- National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012 (1994)]

2.3 Australian Standards

The Australian Standards that may apply to the use, storage, handling and disposal of chemicals at Curtin University can be found at the following website and can be accessed through the Curtin Library databases.

- AS/NZS 2243.1Safety in Laboratories, Planning and Operational Aspects
- AS/NZS 2243.2 Safety in Laboratories, Chemical Aspects
- AS/NZS 2243.10 Safety in Laboratories, Storage of Chemicals
- AS/NZS 3833 Storage and Handling of Mixed Classes of Dangerous Goods, in Packages and Intermediate Bulk Containers
- AS 1940 The Storage and Handling of Flammable and Combustible Liquids
- AS 3780 Storage and handling of corrosive substances
- AS 4775 Emergency Eyewash and Shower Equipment.
- AS 4332 The storage and handling of gases in cylinders.
- AS 1596 The storage and handling of LP gas.
- AS 1894 The storage and handling of non-flammable cryogenic and refrigerated liquids.
- AS 4326 The storage and handling of oxidising agents
- AS 2714 The storage and handling of organic peroxides
- AS/NZS 4452 The storage and handling of toxic substances
- AS 2780 The storage and handling of corrosive substances
- AS4681 The storage and handling of class 9 (miscellaneous) dangerous goods and articles
- AS 1216 Class labels for Dangerous Goods
- AS 1319 Safety Signs for the Occupational Environment

- AS/NZS 1020 The control of undesirable static electricity
- AS/NZS 2022 Anhydrous ammonia – storage and handling
- AS/NZS 2229 Fuel dispensing equipment for explosive atmospheres

2.4 Additional Approvals, Permits & Licensing.

The procurement and possession of some chemical classifications have additional approval, permit and/or licensing requirements. Refer to the relevant sections in this for details of these additional requirements.

- Hazardous Substances
- Nanomaterials
- Scheduled Carcinogens
- Dangerous goods
- Security Risk Substances
- Chemicals of Security Concern
- Scheduled Poisons (including medicines and drugs)
- Precursor Chemicals for Illicit drugs
- Agricultural Chemicals and Veterinary Medicines
- Radioactive Chemicals
- Concessional Spirits

3. SIGNAGE & PLACARDING

3.1.1 Signage & Placarding of Chemical Stores and Buildings

Placarding is required under Dangerous Goods (Storage and Handling of Non-explosives) Regulations 2007 where volumes stored exceed placarding quantities. There are also signage requirements for chemicals stores. For details if these requirements please refer to the Guidance for the Storage of Chemicals document. (AS 1319) **3.1.2 Laboratory Signage**

Individual Schools/Areas are required to ensure that signage is displayed in appropriate locations to identify the presence of hazardous chemicals.

Cupboards, lockers and refrigerators used for storing chemicals should be labelled to indicate the type of chemicals being stored (e.g. the class label for a dangerous good). Additional signs may also be required, such as “do not use to store food”.

4. PREPARATION FOR WORK

4.1 Training & Induction

The purpose of information, instruction and training is to ensure that personnel handling chemicals have the skills and knowledge they need to perform their tasks in a manner that is safe and without risks to health (their own and that of colleagues working around them) and the environment, so far as is reasonably practicable. It should enable them to follow health and safety procedures and use risk controls that are set in place for their protection. It should also provide them with an appreciation of the nature of the chemicals used in the workplace and the risks associated with their use, and the reason why risk controls are used.

The mix of information, instruction and training provided will depend on the severity of the hazards, the level of responsibility of the person and what the person already knows about the chemicals and their use. Where staff hold management responsibilities for chemicals in the workplace, additional training may be required.

All staff and research students with potential for exposure to (working with) chemicals, shall undertake training and induction on the use of chemicals.

The topics that should be covered in chemical safety training and induction as required include:

- pre-purchasing requirements;
- legislation requirements;
- classification of chemicals;
- chemical risk assessment;
- labelling;
- storage and segregation requirements;
- Spills management and emergency procedures:
- handling, storing and disposing of chemical waste and containers;
- transportation requirements;
- PPE
- SDS and other information resources;
- Safe Work Procedures (SWP):
- Managers and Supervisors Training:
- Hazardous Materials:
- Gas Safety; and
- ChemAlert.

For more information regarding training and induction please refer to the HSEM training website.

4.2 Personal Hygiene

Irrespective of the chemical and its associated risks, personal hygiene when handling and storing chemicals is an integral part of controlling physical exposure. Personal hygiene requirements include:

- providing readily available wash up facilities;

- washing hands immediately after using chemicals;
- storing food or drink separately from chemicals (i.e. do not store chemicals and food together);
- ensuring that laboratories, workshops and other areas where chemicals are used, are free from eating and drinking;
- displaying “rules” in laboratories and workshops that include hygiene requirements; and
- wearing and storage of suitable PPE, such as eye/face protection, gloves and over garments (overalls, laboratory coats).

4.3 Family planning and early child care

The University recognises that for those who are intending to conceive, are pregnant or breastfeeding, precautions in addition to normal safe work procedures and practices may be required. If you work directly or indirectly with hazardous chemicals, please advise your line manager as soon as possible of your intention to conceive, of your pregnancy or if you are breastfeeding so that all practicable steps may be taken to minimise risks to you and your child. This information will be used solely for the purpose of assessing the risks and any need to modify your role or transfer you to a safe position. The information will be confidential to those staff who are directly involved in such decisions and putting such procedures in place.

4.4 Chemical Handling

4.4.1 Introduction

In addition to the documentation required for the activity to be undertaken, a review of the working area should also be checked to determine if it is appropriate. This should include (but not limited to):

- Is the right equipment available?
- Does a fume cupboard need to be used? If so what type (recirculating or non-recirculating) and does it need a scrubber? Is this available for use and are the previous chemicals used compatible with what I am using?
- Is there adequate space to work in?
- Do I have the equipment and appropriate storage for the waste produces being generated?

4.4.2 Package opening and transfer

Packages should not be opened, or the contents accessed, in the actual storage cabinet, shelf or immediate storage area to avoid the risks resulting from handling obstructions, close proximity to other packages, accidental escape of chemicals, escape of vapours or dust during transfers and possible reaction with other substances (AS2243.10).

Ventilation shall be provided for the dispensing area to remove vapours and dusts to levels that ensure a safe environment. Exposure standards may be used for guidance. Fume cupboards may be necessary for particularly hazardous chemicals.

Manual handling equipment and/or safe practices shall be utilised when opening or transferring packages.

Where packages are opened for transfer of contents, sampling and repackaging, and for the decanting of cryogenic liquids from one vessel into another, at the end of transfer operations the original package either ‘empty’ or with the residual contents shall be removed from the decant area. After cleaning its exterior to remove any material adhering to the package, the original package shall be returned to storage or disposed.

Liquid dangerous goods should not be poured except from small containers while using appropriate personal protection.

Decanting or pouring should be avoided to reduce the risk of splashing, overfilling, vapour escape and, for flammable liquids, the risk of static electricity discharge. Hand-operated dispensing pumps should be used instead. If decanting is unavoidable (e.g. with viscous liquids), self-closing, non-combustible (preferably metal) taps should be used.

5. SAFETY DATA SHEETS

A Safety Data Sheet (SDS) is a document available in written form or online produced by the manufacturer/supplier/importer for a specific hazardous chemical. This must be made available on purchase of the chemical (See section 8). IMPORTANT: If you purchase a chemical directly from an overseas supplier, Curtin University becomes the importer (See section 8.2).

The manufacturer/supplier/importer must update each of their SDS's at least every five years. If the manufacturer/supplier SDS listed on ChemAlert is more than 5 years old, the Manager/Supervisor shall request from the manufacturer/supplier a more recent version and provide it to the HSEM ChemAlert Administrator so that it may be uploaded into ChemAlert.

Areas are required to retain copies of SDS's for the hazardous chemicals that they order and must provide employees with access to these SDS's in either hard copy or electronic format.

A Safety Data Sheet (SDS), previously called a Material Safety Data Sheet (MSDS), is a document that provides information on the properties of chemicals and how they affect health, safety and the environment in the workplace. For example an SDS includes information on:

- the identity of the chemical,
- health and physicochemical hazards,
- safe handling and storage procedures,
- emergency procedures, and
- disposal considerations.

A safety data sheet must:

- be in English
- contain unit measures expressed in Australian legal units of measurement under the National Measurement Act 1960 (Commonwealth)
- state the date it was last reviewed, or if it has not been reviewed, the date it was prepared
- state the name, Australian address and business telephone number of the manufacturer or the importer
- state an Australian business telephone number from which information about the chemical can be obtained in an emergency.

A SDS must state information about the chemical in the following 16 sections:

Section 1 – Identification: Product identifier and chemical identity
Section 2 – Hazard(s) identification
Section 3 – Composition and information on ingredients

Section 4 – First-aid measures
Section 5 – Fire-fighting measures
Section 6 – Accidental release measures
Section 7 – Handling and storage, including how the chemical may be safely used
Section 8 – Exposure controls and personal protection
Section 9 – Physical and chemical properties
Section 10 – Stability and reactivity
Section 11 – Toxicological information
Section 12 – Ecological information
Section 13 – Disposal considerations
Section 14 – Transport information
Section 15 – Regulatory information
Section 16 – Any other relevant information

An explanation of how to read a Safety Data Sheet can be found on the HSEM website.

Where a chemical manufacturer is no longer in business and a supplied chemical is in use/stored and the chemical must be disposed when the SDS expires, unless appropriate justification can be made to the Head of School/Area to keep it. The justification will need to include an alternative comparable SDS and approved risk assessment which includes an assessment of the chemical age, stability, container & label into consideration.

6. CHEMALERT

6.1 Electronic Chemical Management System

Curtin uses ChemAlert as its electronic chemical management system to assist in meeting regulatory requirements. It provides a register of hazardous chemicals stored, provides access to current manufacturer safety data sheets, and can be used to generate substance labels, local hazardous substance registers and provides dangerous goods manifests for emergency services.
All university staff and students have read-only access to ChemAlert SDS database via the HSEM website from a Curtin computer. Authorised users with passwords can access the full version of ChemAlert for viewing and maintaining chemical stores and manifests.

It is recommended that copies of SDSs for all chemicals be held by each School or Faculty and also made available to the HSEM ChemAlert Administrator for uploading into ChemAlert prior to use of the chemical.

Online training for ChemAlert is available for all staff and HDR students who may be required to use chemicals. Specific Search & Stock training and is made available through the HSEM webpage for staff who require a ChemAlert login. The Head of School/Area shall nominate appropriate staff to manage ChemAlert. Contact the HSEM Department for further information.

6.2 Chemical Holdings

All University workplaces must enter the maximum quantities of hazardous chemicals stored into the ChemAlert Stockholding for the relevant storage location (a partly empty container must be considered as full for this purpose). Each area shall check the ChemAlert Stockholding against the physical stock held (i.e. stocktake) at least twice yearly to ensure all chemicals are entered and the information is correct. This process should be completed prior to the bi-annual chemical waste disposal.

6.3 Other ChemAlert Functions

Authorised login holders can use ChemAlert to produce various reports and information about the stock holdings. These include an Incompatibility Report to assist with the identification of potential chemical storage incompatibilities. ChemAlert also has report functionalities that can provide information to identify other regulatory information such as poisons scheduling on chemicals held. It should be noted that these reports are a guide and are not a replacement for SDS's or risk assessment.

7. RISK ASSESSMENT OF TASKS INVOLVING CHEMICALS

7.1 General Information

Before undertaking any task using hazardous or dangerous chemicals a risk assessment must be undertaken to determine the possible hazards of the product and the control measures required for its safe use. When performing risk assessments, utilise sources of health and safety information such as SDS's from ChemAlert, (SDS database) and/or potential suppliers, together with information available from reputable sources, such as Safe Work Australia, Worksafe and the World Health Organisation. Risk assessment should be performed using the generic HSEM risk assessment form

7.2 Roles and Responsibilities

Who is responsible for ensuring the risk assessment is completed?

Managers and supervisors are responsible for ensuring that risk assessments are undertaken in the areas of their control. The Manager/supervisor is also responsible for ensuring risk assessments are stored, available and reviewed as required.

Who Completes the Risk Assessment?

Task based risk assessments should be conducted by the person conducting the activity work with chemicals. The manager/supervisor endorses the risk assessment ensuring that it has been reviewed by a competent person who has understanding of the work being undertaken and that appropriate hazard control measures will be implemented prior to commencement of work. (The competent person may also be the manager supervisor)

Who is responsible for authorisation?

Finally, the manager/supervisor must authorise the risk assessment to allow the work to commence. Approval may be escalated based on an evaluation of the residual risk according to Curtin University's risk reference tables.

7.3 Review of Chemical Task Risk Assessment

It is good work practice to review assessments whenever undertaking an activity. Safe Work Procedures should be developed when an activity becomes routine and is used by multiple people. The Safe work procedure records the residual risk only.

Risk Assessment should also be reviewed where there are changes to the environment or systems of work that alter the effectiveness of the original controls such as:

- change of chemical supplier;

- a new chemical is introduced into the work area;
- the process or plant is modified;
- new information on the hazards for the chemical becomes available;
- monitoring (environmental or health surveillance) indicates that controls are not adequate;
- accidents and near misses occur;
- chemicals are moved to a new location; and
- improved control measures become available.

7.4 Area Monitoring

Area monitoring refers to the measurement of chemical contaminates in the air (gases, vapours, fumes, dusts, particles etc.), in comparison to the Airborne Exposure Standards of contaminates measured.

Commonly monitoring is undertaken:

- during the risk assessment process to help determine that the controls are adequate and the Airborne Exposure Standards are not being exceeded; or
- continuously in an area as part of the required controls (e.g. oxygen monitors in a room that stores oxygen depleting gas cylinders and/or cryogenic liquids).

Where monitoring is required, it should be completed by a competent person with the appropriate calibrated equipment. Monitoring is a specialised area and needs to be carefully considered and the results need expert interpretation.

Records of the requirement for monitoring and its outcomes must be kept for 30 years and must be made available to persons likely to be exposed as soon as results are available and must remain accessible to them at all reasonable times.

7.5 Health Surveillance

Health Surveillance is the surveillance of a person to identify changes in a person's health status because of potential exposure to certain substances.

Proactive health surveillance should be provided when risk assessment indicates that exposure to a chemical presents a reasonable likelihood that adverse health conditions could occur under particular conditions and there is a scientifically validated method available to monitor it. The purpose of health surveillance is to ensure that control measures are effective and to provide an opportunity to reinforce specific preventive measures and safe work practices.

The initial surveillance should occur prior to the commencement of work and further surveillance during and/or after the period of work involving the substance. Curtin has an approved medical practitioner at Curtin Health Services who can provide health surveillance. Health surveillance records are treated as confidential and must be kept for 30 years.

The Occupational Safety and Health Regulations list some specific hazardous substances that require health surveillance where there is a risk to health from exposure. For detail about these substances, refer to section 17). This is not an exhaustive list of the substances for which health surveillance should be considered. Some other substances for which Health Surveillance should also be considered include carcinogens not listed in section 17 or nanomaterials as identified by risk assessment.

There may be a need for reactive health surveillance where a person is suspected of being exposed to hazardous substances. For details on these requirement and procedures this should be discussed with one or a number of the following:

- Line Manager, School Manager, Faculty Manager etc.
- HSEM
- HR
- Medical staff (doctor)

7.6 Fieldwork

Fieldwork is any approved practical work, teaching, study or research activity, usually conducted outside the normal place of University business. Information about the forms required for fieldwork can be found at the Work Integrated Learning website. Where chemicals are required to be used in fieldwork, this should be identified in this process and the hazards adequately addressed. Please also refer to section 11.1.3 regarding the transport of chemicals in fieldwork.

8. PURCHASE

8.1 Chemical Pre-Purchase Checklist

It is a Curtin requirement when ordering new chemicals into an area, that a Chemical or Gas Pre-purchase Checklist is completed. Where the substances are regulated or controlled, evidence of appropriate purchasing authority must be provided prior to sign off.

All chemicals must be purchased from an Australian supplier where possible. This ensures that the chemical has come from a supplier required by Australian legislation to provide a compliant SDS's and labelling. Where this is not possible, chemicals purchased from overseas suppliers will be considered, however this incurs significantly greater regulation, See Section 8.3.

Please refer to the Pre-purchase Risk Identification Guideline for important information regarding the purchasing of chemicals.

8.2 Purchasing Chemicals from Overseas Suppliers

When a chemical is purchased directly from an overseas supplier, the purchaser is then considered to be the importer or supplier of that chemical. Under Australian Occupational Health and Safety legislation, this means the purchaser will be required to meet the legislative responsibilities of an importer and supplier. This includes ensuring that the labelling of the chemical is compliant to Australian Legislation and the production of an Australian Compliant Safety Data Sheet (see Section 5, Guidance to be developed).

Dependant on the chemical being purchased, there may also be additional legislative restrictions and/or requirements that apply to the importation of that substance. Importation controls or restrictions may apply under the following legislation. This is not an exhaustive list.

- Customs Act 1901 & Customs (Prohibited Imports) Regulations 1956 & Narcotic Drug Act 1967 (For example controls apply to the import of narcotic drugs, psychotropic substances, precursors chemicals and antibiotics androgenic/anabolic substances)
- Chemical Weapons (Prohibition) Act 1994 & Regulations 1997
- Industrial Chemical (Notification and Assessment) Act 1989

- Agricultural and Veterinary Chemicals Code Act 1995 & Regulations 1995

Research and educational institutions are often subjected to lighter import restrictions due to the nature of the intended use of imported chemicals. Import restrictions should be investigated and confirmed on a case by case basis.

8.3 Personal Acquisition or Supply

8.3.1 Chemical Donations

As a general rule Curtin will not accept chemical donations. It is inadvisable, as most often their provenance age and stability are difficult to verify. Exceptions can be made with the approval of a manager/supervisor, where sufficient justification is made as to why Curtin is to accept the chemical. This must include a risk assessment incorporating the life cycle of the chemical and cost of disposal.

8.3.2 Samples

When Curtin receives samples for research and or analytical purposes, planning and risk assessment must be in place to prior to receiving the samples. A sample management plan should be generated detailing what is being accepted. This should include a risk assessment incorporating the life cycle of the sample.

Specific attention must be made to the disposal requirements of the samples. This must be agreed with a client. All disposal costs should be defined with a client as part of the research contract before accepting the samples into the university.

9. LABELLING

9.1 Labelling systems

The purpose of labelling is to ensure that the contents of a container can be readily identified by product name, and to provide basic information about the contents of the container – its ingredient(s), hazards and precautions for safe use.

Labelling of containers must adhere to Globally Harmonized System of Classification and Labelling of Chemicals 3rd revised edition (GHS). Whilst the new WHS regulation have not formally been accepted by Western Australia, the GHS has been formally adopted into the existing Occupational Health and Safety Legislation. The use of the GHS will be mandatory for the rest of Australia after 31st December 2016 under WHS. Any manufacturer working outside of WA will have to comply with this. Curtin will be adopting the GHS system in line with the rest of Australia and the likelihood WA will adopt the new WHS regulation in the near future. Chemicals labelled under The National Health and Safety Council's, National Code of Practice for the Labelling of Workplace Substances. NOHSC: 2012 (1994) are being phased out but will remain compliant until 31 Dec 2016.

9.2 GHS

The *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) is a single internationally agreed system of chemical classification and hazard communication through labelling and Safety Data Sheets (SDS). The GHS is published by the United Nations and is sometimes referred to as 'the purple book'. It includes harmonised criteria for the classification of:

- physical hazards,
- health hazards, and

- environmental hazards.

9.3 Labelling responsibilities

Table 2: Duties and responsibilities for labelling

Duty holder	Responsibilities
Manufacturers and importers	• Ensure that the chemical is correctly labelled.
Suppliers	• Must not supply a hazardous chemical to a workplace if the supplier knows, or ought reasonably to know, that the chemical is not correctly labelled.
Person who is conducting a business or undertaking (Curtin University)	• Ensure that any hazardous chemical that is used, handled or stored at the workplace is correctly labelled**.** • Ensure that a hazardous chemical is correctly labelled if the chemical is manufactured at the workplace; or transferred or decanted from the chemical's original container at the workplace. • Ensure, so far as reasonably practicable, that containers are correctly labelled while holding a hazardous chemical. • Ensure that containers that are labelled for holding a hazardous chemical are used only for the use, handling or storage of the hazardous chemical.

9.4 What information must be included on a label?

A hazardous chemical is correctly labelled if the chemical is packed in a container that includes the following:

- is written in English
- the product identifier
- the name, Australian address and business telephone number of either the manufacturer or importer
- the identity and proportion disclosed, in accordance with Schedule 8 of the WHS Regulations, for each chemical ingredient
- any hazard pictogram(s) consistent with the correct classification(s) of the chemical
- any hazard statement(s), signal word and precautionary statement(s) that is consistent with the correct classification(s) of the chemical
- any information about the hazards, first aid and emergency procedures relevant to the chemical, which are not otherwise included in the hazard statement or precautionary statement, and
- the expiry date of the chemical, if applicable.

You may include any information on the label that does not contradict or cast doubt on any other information that is required on the label. The following additional information should also be included on the label, where available:

- an emergency phone number, for specific poisons or treatment advice
- the overseas name, address and telephone number of the manufacturer or supplier

- a valid website or internet address
- reference to the safety data sheet, for example a statement on the label that says: “Additional information is listed in the safety data sheet”.

9.5 Labelling design layout

The label must be written English.

The size of a label should be:

- large enough to contain all of the relevant hazard and other information in a size and style that is easily visible and legible in the workplace
- appropriate to the size of the container, with larger labels present on larger containers.

The information on a label may be presented using one or more panels, or sections, dependent on the size and shape of the container. The label should be firmly secured to the outside of the container and should be visible in the normal storage position. The label should be sufficiently durable so as to remain legible and firmly attached to the container for the foreseeable lifetime of the product under normal storage and handling conditions.

The information and hazard pictograms on any label should be printed in a colour or colours that provide a distinct contrast to the background colour.

The following table is provided as a guide for the minimum dimensions for hazard pictograms and sizes of text on containers of various capacities:

Table 3: Minimum dimensions for hazard pictograms and sizes of text

Container capacity	Minimum hazard pictogram dimensions	Minimum text size
≤ 500 mL	15 x 15 mm	2.5 mm
> 500 mL and ≤ 5 L	20 x 20 mm	3 mm
> 5 L and ≤ 25 L	50 x 50 mm	5 mm
≥ 25 L	100 x 100 mm	7 mm

Note 1: Refer to the ADG Code for marking requirements for dangerous goods being transported.

9.6 ChemAlert Labels

9.6.1 For original containers.

In most cases the simplest method to produce compliant labels is to print them from ChemAlert which provides a range of labels suitable for drums, Winchesters and small bottles, including some label templates. Additional labels may be required in the event that the vendor cannot or will not provide replacement labels swiftly, or where decanting from the original container into smaller/additional containers has occurred.

9.7 Special Labelling Situations

9.7.1 Small containers

Where a hazardous chemical is packaged in a container that is too small to attach a label with information that is required of hazardous chemical labels in general, then the label must be written in English and include the following:

- the product identifier
- the name, Australian address and business telephone number of either the manufacturer or importer.
- a hazard pictogram or hazard statement that is consistent with the correct classification of the chemical, and
- any other information required for hazardous chemicals labels in general that is reasonably practicable to include.

9.7.2 Research chemicals or samples for analysis

If a hazardous chemical is used for research purposes only or is a sample for analysis, the label must, at a minimum, be written in English and include the product identifier and a hazard pictogram or hazard statement that is consistent with the correct classification of the chemical.

9.7.3 Decanted or transferred hazardous chemicals

If a hazardous chemical has been decanted or transferred from the container in which it was packed and it will not be used immediately or it is supplied to someone else, the label must, at a minimum, be written in English and include the following:

- the product identifier, and
- a hazard pictogram or hazard statement consistent with the correct classification of the chemical.

decant means to transfer a hazardous chemical from a correctly labelled container to another container within a workplace. Such a container may range from a small flask in a research laboratory to a large vessel that is used to contain reaction components prior to use in a mixing or reaction process.

Where the entire amount of a decanted hazardous chemical will be used immediately, labelling of its container is not required.

A decanted hazardous chemical can only be considered to be used immediately in situations where:

- it is not left unattended by the person who decanted it
- the decanted hazardous chemical is used only by a person present at the decanting process
- the container is subsequently rendered free from any hazardous chemical immediately after use, so the container is in the condition it would be in if it had never contained the chemical.

9.8 Container Incorrectly Labelled

If a container is not properly labelled, for example the label has been lost, the container should have the product name, if known, attached to it. Unlabelled containers of an unknown chemical shall be labelled:

"CAUTION DO NOT USE: UNKNOWN SUBSTANCE".

The container shall be removed from use and the Chemical Waste Management Contractor contacted to arrange for its disposal.

10. STORAGE

10.1 Storage of Chemicals

Chemicals must be stored appropriately according to legislative requirements. Properties have produced a Design Guideline on the Storage of Chemicals to cover the design, construction and use of chemical stores and storage. The management aspects of this document have been incorporated into this section. (Document is being peer reviewed). Storage of gas cylinders should comply with Curtin's guidance document. (Document is being peer reviewed)

10.2 Storage Requirements

10.2.1 Storage principles

The following general principles apply to the storage of chemicals.

- The quantities of hazardous chemicals stored shall be kept to a minimum, commensurate with their usage and shelf life. Some chemicals degrade in storage and can become more hazardous. Such chemicals shall be identified and managed appropriately.
- Containers that have held hazardous chemicals shall be treated as full, unless the receptacle or package has been rendered free from hazardous chemicals.
- Storage of chemicals, including wastes, shall be based on the properties and mutual reactivity's of the chemicals. Incompatible chemicals shall be kept segregated from one another, e.g. by fire isolation in a chemical storage cabinet or segregation in space. A separate spill catchment shall be provided for each incompatible liquid.
- Opening of packages, transferring of contents, dispensing of chemicals or sampling shall not be conducted in or on top of a cabinet or a cupboard for storing hazardous chemicals unless it is specifically designed for this purpose and appropriate procedures and equipment are used.
- Provision shall be made for the receiving and dispatch of materials, and the inspection of packages for damage.
- Packages shall be inspected regularly to ensure their integrity. Leaking or damaged packages shall be removed to a safe area for repacking or disposal. Labels shall be reattached or replaced, as necessary, to clearly identify the contents of the package.
- Procedures shall be established to deal with clean up and safe disposal of spillages. Supplies and materials needed to control the spillages shall be readily accessible.
- Substances which are unstable at ambient temperature shall be kept in a controlled temperature environment set to maintain an appropriate temperature range. Reliable alternative safety measures shall be provided for situations when utilities, such as power, fail. Substances that can present additional hazards on heating shall be clearly identified.

- Sunlight can affect some plastic containers or the chemical contents. Containers or chemicals that can be affected shall not be stored in a laboratory where they can be exposed to direct sunlight if there is potential for the sunlight to create a safety hazard. If the stability of the chemical can be affected without creating a safety hazard, procedures shall be in place to ensure the chemical is assessed prior to use.
- Substances subject to additional regulation may stipulate additional storage requirements.

10.3 Segregation & Incompatibility of Chemicals

When storing chemicals it is imperative to consider storage compatibility for chemicals from different dangerous goods classes. Chemicals may need to be isolated or separated by sufficient distance to eliminate the risk of fire, explosion, or accumulation of toxic gases or vapours from a leak or spillage etc. The principal source of guidance regarding conditions for safe storage and compatibility is the SDS for the relevant chemicals. Information on compatibilities should be identified within the SDS. Table 3 provides some guidance as to compatibility between the classes of dangerous goods.

Table 4: Guidance to compatibility between classes of dangerous goods

Class / Division		2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	8	9
2.1	**Flammable Gas**	A	E	C	B	B	D	B	D	D	C	B	B
2.2	**Non-flammable non-toxic gas**	E	A	B	E	E	E	E	B	E	B	B	B
2.3	**Toxic Gas**	C	B	A	C	C	C	C	C	C	B	B	B
3	**Flammable liquid**	B	E	C	A	B	D	B	D	D	C	B	B
4.1	**Flammable solid**	B	E	C	B	A	D	B	D	D	C	B	B
4.2	**Spontaneously combustible**	D	E	C	D	D	A	B	D	D	C	B	B
4.3	**Dangerous when wet**	B	E	C	B	B	B	A	D	D	C	D	B
5.1	**Oxidizing agent**	D	B	C	D	D	D	D	A	D	F	D	F
5.2	**Organic peroxide**	D	E	C	D	D	D	D	D	G	F	D	F
6.1	**Toxic**	C	B	B	C	C	C	C	F	F	A	B	B
8	**Corrosive**	B	B	B	B	B	B	D	D	D	B	G	B

Class / Division		2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	8	9
9	Miscellaneous dangerous goods	B	B	B	B	B	B	B	F	F	B	B	A

Note: In this table, combustible liquids should be included with Class 3.

A - Most dangerous goods of the same class have similar primary hazards and are usually considered to be compatible.

B - With a few exceptions, which should be indicated on the SDS, goods of these two classes are usually non-reactive with each other. However, in an emergency such as a spill, leak or fire, the presence of the second class may lead to different hazards or increased risk such that additional control measures are required.

C - While goods of these two classes are usually non-reactive with each other, a fire involving the fire risk goods may lead to the release of large clouds of toxic gases or vapours.

D - Goods of these two classes are likely to interact with each other in such a way as to significantly increase risk. In some cases, interaction may result in fire or evolution of toxic vapours. For those that do not interact, a fire involving one may be violently accelerated by the presence of the other. These classes should not be kept in the same area unless it can be demonstrated that the risks are fully controlled.

E - If the Division 2.2 has a Subsidiary Risk 5.1, then this is D, otherwise it is B.

F - If the Division 6.1 or 9 is a fire risk substance, then this is D, otherwise it is B.

G - If one material is a concentrated, strong acid and the other is a concentrated, strong alkali, then this is D, otherwise it is A.

Unstable chemicals — unstable at or below ambient temperature requiring storage in a cold store; unstable at or above ambient temperature and requiring some shade.

ChemAlert has an incompatibility reporting function that can assist in the identification of incompatible chemicals based on DG class. Additional chemical specific incompatibilities will also need to be considered.

10.4 Decanting

Where reasonably practicable chemicals should be kept in their original container with the original labelling from the manufacturer/supplier. Where chemicals are decanted the new containers must be appropriate for the chemical they will hold and be correctly labelled (section 2.VIII page 53).

Decanting chemicals in explosive atmospheres or chemicals that may produce explosive atmospheres require special arrangements that will not produce static electricity (e.g. fume cupboards, earthing equipment, non-synthetic protective garments). Decanting shall not be performed in chemical stores.

Particular attention must be given to decanting chemicals that pose unique hazards such as:

- solvents which can create explosive atmospheres; and
- asphyxiants.

10.5 Storage of Time Sensitive Chemicals

Time-sensitive chemicals are those chemicals that, when stored for prolonged periods, under poor storage conditions or not correctly maintained, can develop hazards that were not present in the original formulation.

There are four general categories of time-sensitive chemicals loosely based on those unsafe properties that can develop, being:

1) peroxide formers,
2) peroxide formers that can undergo hazardous polymerization,
3) materials that become shock or friction sensitive upon the evaporation of a stabilizer, and
4) materials that generate significant additional hazards by undergoing slow chemical reactions.

It should be noted that time-sensitive chemicals can be pure reagents or they can be commercial mixtures formulated as cleaners, adhesives and other products.

All time-sensitive chemicals should be immediately indelibly marked with an expiration date upon receipt and listed on the laboratory chemical inventory to ensure timely disposal. The SDS for the chemical will state whether it is unstable under certain conditions or after a period of time in storage, and this information should be highlighted in the risk assessment.

Containers should be inspected periodically to verify their condition. Signs of peroxide formation include: crystal formation in the container, discoloration of liquids, or a “mossy” appearance around the cap. If suspect materials are recognized, do not handle the container. Particularly, **do not** attempt to remove the cap. If explosive crystals have formed around the cap, the friction created by the unscrewing of the cap may be enough to detonate the compounds.

When purchasing time sensitive chemicals it is important to purchase minimum quantities, document the purchase date, maintenance regime and dispose after the end of use or expiry date, whichever is sooner.

Table 5: Guidance on Storage Limits of Some Common Time Sensitive Chemicals.

Peroxide hazard on storage – Discard after 3 months	
Divinyl acetylene	Potassium metal
Divinyl ether	Sodium amide
Isopropyl ether	Vinylidene chloride
Potassium amide	
Peroxide Hazard on Concentration-Discard After One (1) Year	
Acetal	Ethylene glycol dimethyl ether (glyme)
Cyclohexane	Furan
Cyclooctene	Metal acetylene
Cyclopentene	Methyl cyclopentane
Cumene	Methyl-i-butyl ketone

Diacetylene	Tetrahydrofuran
Dicyclopentadiene	Tetrahydronaphthalene
Diethylene glycol dimethyl ether (diglyme)	t-Butyl alcohol
Dioxane	Vinyl ethers
Ethyl ether	
Hazardous to peroxide Initiation of Poymerization – Discard after 1 year	
Acrylic acid	Styrene
Acrylonitrile	Tetrafluoroethylene
Butadiene	Vinyl acetate
Chlorobutadiene (Chloroprene)	Vinyl acetylene
Chlorotrifluoroethylene	Vinyl chloride
Dibenzocyclopentadiene	Vinyl pyridine
Methyl methacrylate	Vinylidene Chloride
Other Time sensitive chemicals	
Chloroform (on contact with air)	Sodium azide (on contact with metals)
Picric acid (when dry)	Picrylsulfonic acid (when dry)
Picryl Chloride (when dry)	Anhydrous Hydrogen flouride

10.6 Chemical Storage in Laboratories

The quantities of hazardous chemicals stored in laboratories should not exceed those specified in Table 6. Incompatible chemicals shall not be stored together unless properly segregated (Table 4). It is recommended that chemicals stored in the laboratory are located within a chemical storage cabinet and not purely reliant on these exempt volumes.

Table 6: Quantities of hazardous chemicals permitted to be stored in a lab other than in a chemicals storage cabinet

Type of substance or Class of dangerous goods	Maximum per 50m^2 (kg or L)	Maximum pack size (kg or L)	Conditions for storage
Class 3 primary or sub-risk	10	5	Labelled standard laboratory cupboard or in small amounts throughout the laboratory
Combustible liquids	50	20	Labelled standard laboratory cupboard or in small amounts throughout the laboratory
Classes 4.1, 4.2, 4.3, 5.1 or 5.2	20 but less than 10 of any one Class	10	Labelled standard laboratory cupboard or, for Classes 4.1, 4.3 and 5.1, in small amounts throughout the laboratory
Class 6.1	PG I 10 Other 50	PG I 10 Other 20	Labelled standard laboratory cupboard or in small amounts throughout the laboratory
Class 8	20 for liquids 50 for solids	20	Labelled standard laboratory cupboard or in small amounts throughout the laboratory
Class 9 and aerosols	50 for liquids 100 for solids	5 for liquids 20 for solids	Labelled standard laboratory cupboard or in small amounts throughout the laboratory
Maximum aggregate quantity	**200**		
Hazardous Substances		5 for liquids 20 for solids	Labelled standard laboratory cupboard or in small amounts throughout the laboratory

Taken from AS/NZS 2243.10: 2004. Please refer to the AS for more details and additional table notes.

Chemicals kept on shelves or racks shall be subject to the following restrictions:

a. Shelving and its fixtures shall be compatible with the goods stored, or shall be suitably protected from the goods (NOTE: the use of particle board is not recommended as they may fail when subjected to moisture or chemicals

b. The maximum holding capacity of the shelving systems shall not be exceeded

c. Shelves used for chemical storage shall be restrained against lateral movement and shall have lips on them to prevent containers being pushed through to the other side.

Where there is a specific requirement to hold greater quantities of chemicals in the laboratory the design and management can be changed to accommodate this. Chemicals in quantities above those stated in Table 6 will be stored within a chemical storage cabinet.

The capacity of any chemical storage cabinet used in a laboratory to store chemicals of Classes 4.1, 4.2, 4.3, 5.1 or 5.2 shall not exceed 50 L. For other chemicals, the capacity shall not exceed 250 L.

Within a radius of 10 m, measured from any one cabinet, the cabinet storage capacity aggregated for all cabinets in that radius shall not exceed 250 L or 250 kg. Incompatible chemicals shall not be stored together. Separate chemical storage cabinets shall be used to maintain proper segregation. For further information refer to the Design Guideline

10.7 Chemical Storage Using Refrigerators

Laboratory refrigerators that are used to store flammable solvents or other volatile chemicals may accumulate flammable or explosive atmospheres inside the unit. Under these conditions ignition sources from the refrigerator may cause an explosion. AS 2243.2 Section 4.4.3 (c) requires the following:

- A refrigerator may be used to store flammable chemicals provided it has been designed and manufactured to eliminate ignition sources. It may be possible for a domestic refrigerator to be modified by a competent person to eliminate ignition sources.
- Domestic refrigerators or freezers shall not be used for storing flammable or explosive chemicals. The potential for hazardous situations arising through loss of electrical power is to be considered, for example, release of flammable or toxic vapours; energetic decomposition of reactive materials on warming.
- 'Intrinsically safe' purpose-built laboratory refrigerators or freezers are preferred for all chemical storage where refrigeration is required, and is mandatory in the case of flammable or explosive chemicals.
- Electrical equipment shall comply with AS 3000 – Electrical Installations if installed or other appropriate standards if portable.
- Storage of chemicals, including wastes, shall be based on the properties and mutual reactivities of the chemicals. Incompatible chemicals shall be kept segregated from one another, e.g. by fire isolation in a chemical storage cabinet or segregation in space. A separate spill catchment shall be provided for each incompatible liquid.
- It is strictly forbidden to store food or drink items in laboratories unless they are for research purposes. Food or drink that will be consumed as part of a research study must be kept in a dedicated refrigerator which is not used for any other purpose. All other laboratory refrigerators must be clearly marked "**NO FOOD OR DRINK ITEMS TO BE STORED IN THIS FRIDGE**".

10.8 Chemical Stores

For details of the requirements of chemical stores please refer to the design guideline.

11. TRANSPORTATION OF CHEMICALS

11.1.1 General transport around campus

The transport of samples, chemicals and/or gases should be actively minimised.

Chemicals should be purchased in quantities to be used at that time and not be stored for long periods of time. Where a chemical is required in more than one location it shall be purchased in multiple small quantities and the chemical is delivered and stored at each location where it is required. Where transport of chemical, samples and/or gases is deemed essential, a risk assessment of the transportation must be undertaken.

The exception for transporting chemicals would be the movement of research from one facility to another. At this time the preferred method of transportation will be for the move to be completed by an external party (Curtin approved contractor) which will be included as part of the move costs. The contractor can be arranged through Properties and arrangements should be made at least 3 weeks in advance of the proposed move date.

11.1.2 Movement within a building /School area

The movement of chemicals within a building or school will be controlled and managed by the building manager and/or technician. For transportation to occur the following must be properly documented and approved:

- Risk assessment
- Movement/traffic routes (starting point and finishing point)
- Time of movement
- Does the end location have all the requirements for that chemical
- Package requirements
- Equipment requirements (i.e. trollies)
- Adherence to SDS recommendations

The possibility of incompatible materials contacting one another, as a result of a container failure while being transported through or moved in the store, shall be evaluated. It shall be ensured that such materials can be conveyed in a manner which will not allow chemical interaction.

11.1.3 Field investigations

Curtin does not and will not transport dangerous goods as defined in the Australian Dangerous Goods Code Edition 7.3. If under exceptional circumstances dangerous goods of these quantities are required on site they will be transported by specialist contractor licensed to transport dangerous goods.

From time to time there may be a requirement to transport chemicals into the field. Any requirement for the transport of chemicals for field work should be identified at the start of a project as part of the risk assessment documentation. All appropriate documentation identified in Section 7.4 must be developed and approved prior to going to site.

In addition to the above documentation any requirements of the DMP or presented in the Australian Dangerous Goods Code Edition 7.3 for small quantities must be adhered to. The requirements of the SDS must also be adhered to.

12. CHEMICAL WASTE AND DISPOSAL

12.1 Introduction

Chemical waste and its disposal is controlled by the Environmental Protection Act 1986 and the Environmental Protection (Controlled Waste) Regulations 2004 in order to protect the environment. For the purposes of this section, chemical waste is defined as any chemical whether solid, liquid, gaseous which is discharged, emitted or deposited in the environment in such volume, constituent or manner as to cause an alteration in the environment.

Chemical waste includes any otherwise discarded, rejected, unwanted, surplus or abandoned chemical whether intended for sale or any further use (including recycling) regardless of value.

A full list of controlled waste can be found in Schedule 1 of the Environmental Protection (Controlled Waste) Regulations 2004.

Where practicable chemical waste should be reduced to lower the impact on the environment. For example a trained person could neutralise unwanted hydrochloric acid by adding sodium bi-carbonate. This would reduce the impact on the environment as transport of the waste would be eliminated. Please refer to the local area waste procedures and water corporation guidelines.

12.2 Responsibilities

Heads of Schools and areas are responsible for ensuring there is sufficient waste management process in place. Managers/Supervisors must ensure, so far as is reasonably practicable, that chemicals are acquired in minimum quantities that mitigate or reduce waste. Chemical waste remains the responsibility of the purchaser or producer until the point of its authorised discharge or disposal.

Chemical waste should not be allowed to accumulate and must only be mixed with compatible classes, personal protective equipment should be used when handling chemical waste as recommended in the SDS and risk assessment.

12.3 Chemical Waste Disposal

Curtin arranges for a licenced contractor to collect chemical waste on site twice annually. Please refer to the Chemical Waste Management Process (in preparation) for details. If individual areas require waste collection more frequently, the area can arrange an additional waste collection directly with the waste contractor. Chemical disposal contractors will issue a receipt outlining the waste collected, which must be kept as a record for 3 years.

12.4 Trade waste

Many Curtin facilities have Trade Waste Permits that allow for certain types of chemical waste that meet stipulated acceptance criteria to be discharged by the sewer system. However, chemical waste disposal by a licenced contractor (as described in section 12.2) is the preferred method of waste disposal.

12.5 Labelling Chemical Waste

Where waste is collected for disposal it must be stored in container that is fit for the purpose and cleaned of spills on the outside. The label must contain the following information:

- chemical name or , mixture ingredients, waste category, waste type, UN No., class and HAZCHEM Code.;

- the statement “Chemical Waste For Disposal” on at least two sides of the container, departmental name and number;
- dangerous goods class label or GHS pictogram (if applicable);
- packaging group;
- volume

12.6 Storage of Chemical Waste

Chemical waste must be stored appropriately (including segregation and bunding) so that the container/receptacle is impervious to rodents and insects, and in such a way that it does not detrimentally affect the surrounding area by odour, visual pollution, air pollution, noise pollution and so on.

Chemical containers of some hazardous and/or dangerous goods may be classified as chemical wastes and require dedicated disposal. Check the SDS and the ChemAlert product information for information about a given chemical. All chemicals and used spill kits shall be disposed of safely in accordance with the Safety Data Sheet and legislated requirements, by an Environmental Protection Authority (EPA) approved registered contractor.

12.7 Old or Obsolete Chemicals

Chemicals older than 5 years shall be disposed of as a Curtin preference, unless appropriate justification can be made to keep it. The justification will need to include a current compliant SDS and approved risk assessment which includes an assessment of chemicals age, stability, container & label.

When you finish a project, leave a building/department or cease working at Curtin you must ensure that all chemicals and reagents are safely dealt with before you leave. Check storage areas including fridges and freezers for any items that were your responsibility while at Curtin and arrange a chemical handover with your facility manager.

12.8 Contaminated items

Empty chemical containers that have contained dangerous/hazardous goods or may still contain residue, contaminated equipment, such as pipettes, broken glassware, Contaminated PPE and used spill kit items should also be treated as chemical waste. These items should be disposed of as laboratory waste through the MediCollect clinical waste system, segregated where necessary from other types of controlled waste (i.e. biological waste to be autoclaved rather than incinerated.)

13. CHEMICAL SPILL OR GAS LEAK

13.1 General University Procedure

The Bentley Campus University Emergency Procedures Booklet provides guidance for what to do in the case of a chemical spill or gas leak, which are outlined below in section 13.1.1 and 13.1.2. In a life threatening situation call 0 000.

13.1.1 Hazardous Material Spill or Gas Leak

If the identity of the chemical spill is unknown treat it as poisonous material and do not attempt to clean up.

Attempts to contain or clean up spills or releases should not be attempted unless you have been trained to do so. (See section 13.4)

Action Steps

- Advise others in the immediate area to vacate immediately and report to the assembly area;
- Upon leaving the contaminated area close all doors;
- Do not allow other people to enter the contaminated area;
- If anyone is contaminated set up an isolation area and if available assist them to a safety shower to wash off contamination. Affected area should be rinsed for a minimum of 15 minutes;
- Report what you have seen and done to Security at 4444 from an internal phone or 9266 4444 from an external phone;
- Do not re-enter the contaminated area until the all clear has been given by security or other emergency personnel.

13.1.2 Gas leak or Flammable Liquid Spill.

- Activate the alarm by pushing the break glass unit (Red box);
- Turn off all mobile phones
- Do not operate any electrical equipment
- Advise others to clear the area immediately and report to the assembly point.

13.2 Preparedness

Each workplace shall be prepared for a spill event. This will be different for each laboratory and it will be the responsibility of the Lab manager or area supervisor to ensure appropriate preparedness is in place,

Procedures for the handling and management of spills will be documented and approved. The procedures will also state any special requirements (i.e. additional storage of calcium gluconate where HF is being used, the use of CO2 or appropriate foam fire extinguishers where DG4.3 are being stored).

All areas where chemicals are being used and stored will have appropriate spill kits and cleaning facilities. This may also include appropriate PPE suitable for the chemicals being cleaned up.

13.3 Spill prevention and containment

In order to try and prevent spills the following will be undertaken/ available:

- Procedures for the handling and management of spills
- Display response steps and contact numbers in work locations where spills are foreseeable
- Test chemical spill response preparedness at regular intervals
- Ensure a First Aider is available, and first aid kit, with access to any special first aid provisions necessary (e.g. calcium gluconate for Hydrofluoric acid)
- Suitable spill kits readily accessible and checked on a regular basis
- Spill kit are restocked/replaced after a spill event
- Provision of suitable PPE
- Access (within 10 Seconds) to an eye wash station and emergency shower
- Provide safe facilities e.g. laboratory bench surfaces, drainage systems and ventilation systems

- Ensure chemicals are stored appropriately including provision of well-sealed containers, bunding trays, cabinets with inbuilt spill retention, and stores with bunding
- Ensure suitable equipment (fume cupboards and ventilation systems) are available and used.

13.4 Spill clean-up

Spill clean-up should only be undertaken by trained personnel who can make a determination of if the spill clean-up can safely be managed locally. The procedures and spill clean-up will be undertaken using advice provided in the SDS. Generally chemical spills will be cleaned up by taking the following actions:

1. Ensure the surrounding area is secured and if appropriate evacuated.
2. If safe to do so, stop the spill if required
3. Ensure any casualties are accounted for. If safe, apply first aid (this includes moving to emergency shower and eye wash) and/or if appropriate move to a safe location
4. Ensure the lab manager/ supervisor has been informed of the incident and alert the appropriate authority (this may depend on the level of spill and severity of casualty)
5. If safe to do so, start cleaning up the spill following the procedures developed:

- Apply spill kit
- If appropriate dilute and wash down with water
- If a spill is on the floor or walkway ensure appropriate signage is in place informing people to be aware of potentially slippery surfaces

6. Appropriately dispose of waste material

13.5 Chemical incidents and spill reporting

In a life threatening situation call 0 000. If there is an incident that requires an emergency response call Security ext 4444 and the Emergency Planning Manager ext 2653 and follow the procedures in Section 14.

All incidents and spills involving hazardous substances must be reported on the online reporting system. Investigation of these incidents will occur in line with the Curtin University incident investigation procedures.

14. EMERGENCY PROCEDURES

14.1 Emergency Management

Emergency procedures must be prepared in accordance with the Emergency Plan (this can be located at the following links Bentley or Kalgoorlie) which incorporates AS 3745.2010 Planning for Emergencies in Facilities.

For life threatening situation call (0) 000.

If there is an incident that requires an emergency response, call Security ext. 4444 who will assess the situation and escalate to the Emergency Management team where appropriate.

For general Emergency Management enquires contact EPM on ext. 2653.

14.2 Information for Emergency Services Personnel

It is the responsibility of the Emergency Planning Manager to:

- ensure that information related to chemicals that are stored/used on site is passed on to the appropriate emergency services.

Nominated security staff and Emergency Management Staff shall have access and be trained in the ChemAlert database/DG Advisor to forward copies of Hazardous and Dangerous Goods Register to Curtin Security 6 monthly.

This information should be in the form of:

- Hazardous and Dangerous good chemical register
- ChemAlert
- Site Location

14.3 Dangerous Goods Manifest

The Dangerous Goods Manifest is to be located in the Security Control Room and with Emergency Management. Modified HAZCHEM manifests are located at Emergency Warning and Intercommunication System panels at every building where manifest quantities are located (in progress).

The manifest is revised and updated when:

- There is a change in any of the information.
- There is a change in the relevant legislation.

14.3.1 Risk Assessment

Should determine and include:

- general first aid requirements and appropriately trained first aiders (including their location and contact details);
- location and access to emergency showers and emergency eyewash stations;
- specific first aid requirements that may be required for some chemicals (eg cyanide requires administration of oxygen, HF contact with skin requires application of calcium gluconate);
- spill kits appropriate for the physical properties of the chemical;
- additional equipment to mitigate or reduce environmental impact (spills should be contained wherever possible, and floor drains and sinks should be isolated);
- fire fighting medium appropriate for the physical properties of the chemical;
- consideration of the need for environmental monitoring devices.
- consideration of the need for Self Contained Breathing Apparatus; and
- consideration of the need for environmental monitoring devices.
- the management of spills and leaks;
- shutdown procedures;
- supporting Curtin University emergency procedures;

- the physical properties of chemicals (including fire and explosion potential, environmental damage and the likely health effects if exposure occurs);
- additional equipment to mitigate or reduce environmental impact (spills should be contained wherever possible, and floor drains and sinks should be isolated);

14.4 Local Area Emergency procedures

The Manager/Supervisor of an area or laboratory must ensure that local emergency procedures are developed and maintained that take into account the physical properties of chemicals including, fire and explosion, environmental damage and the likely health effects if exposure occurs. It is the responsibility of schools to update their chemical register in ChemAlert for the buildings they occupy when new chemicals are purchased, used or disposed.

The local area emergency procedures should be determined prior to process commencement and the local emergency procedures must be developed and take into account:

- the physical properties of the chemical including, fire and explosion, environmental damage and the likely health effects if exposure occurs (this information will be provided on the SDS); and
- the full life-cycle and intended use of the chemical from delivery/receipt through to waste collection.
- the management of spills and leaks;
- supporting Curtin University emergency management plan and associated procedures.

15. INCIDENT REPORTING

15.1 Loss/Theft or suspicious behaviour

The university and some staff are empowered by licence or campus permit to possess certain drugs or other controlled substances. Some of these drugs and substances may be subject to misuse, diversion for illicit trafficking or conversion to other drugs for misuse. Workplaces are to ensure adequate arrangements are in place for security, storage, record-keeping and general control in accordance with the requirements of the permit conditions and relevant legislation.

In addition to reporting any incidents involving chemicals (see section 14), all incidents in which there are reasonable grounds to suspect:

- Theft: a theft or loss of a chemical, drug, or prohibited substance
- Unaccounted loss: a quantity of chemicals, drugs or prohibited substances that cannot be reasonably accounted for, or
- Suspicious behaviour: A staff member and/or contractor who has access to chemicals, drugs or prohibited substances exhibits such behaviour that you or others reasonably suspect that the person may be abusing or diverting drugs or other chemical substances.

Must be reported to the Director Health, Safety and Emergency Management ext. 2137

16. RECORDS

Records of the following documents must be kept for the period specified.

1. Risk assessments that identify a hazard or significant degree of risk to health are to be kept for 30 years. Monitoring results and health surveillance reports must also be kept for 30 years;

2. risk assessments identifying no hazards/significant degree of risk to health must be kept for 5 years;
3. training records are to be kept for at least 5 years;
4. tank inspection records are to be kept while the tank remains in service;
5. fire protection system testing records are to be kept;
6. incident investigations involving material harm must be kept for the life of the facility
7. Certificates of disposal must be kept in accordance with the Site Environmental License and the Environmental Protection (Controlled Waste) Regulations 2004.

17. NANOMATERIALS

17.1 Terminology

Nano-objects are defined as materials with one (nanoplate), two (nanorod) or three (nanoparticle) external dimensions in the nanoscale (i.e. between approximately 1 and 100 nm). Nano-objects can form agglomerates and aggregates. For the purpose of this document, the term nanomaterials shall apply as a collective for to the above materials.

17.2 Legislation

There is currently no WA legislation dealing specifically with nanomaterials. However, legislation covering chemicals is applicable to nanomaterials. In WA, nanomaterials are covered under the Occupational Safety & Health Act & Regulations as part of the regulations that cover hazardous substances/chemicals.

17.3 Types of Engineered Nanomaterials

While some occur naturally, many nanomaterials are engineered with specific properties in mind. Table 7 provides details on some of the more common types of engineered nanomaterials to which this guide might be applied.

Table 7 Common types of engineered nanomaterials

Type	Description	Characteristics
Fullerenes	Fullerenes comprise one of four types of naturally-occurring forms of carbon. Their molecules are composed entirely of carbon and take the form of a hollow sphere. One of the most commonly described fullerenes is C60, known as a Buckminster fullerene or a buckyball. Fullerenes are chemically stable materials and insoluble in aqueous solutions. Potential applications include drug delivery, coatings and hydrogen storage.	carbon-only molecules (hollow sphere, ellipsoid, tube, or plane)
Carbon nanotubes	Carbon nanotubes (CNT) are allotropes of carbon with cylindrical structure, high-aspect ratio different tube diameters and lengths as well as tube structures principally consisting of one to many layers of tubular graphene-like sheets. The principal types are usually grouped into SW (single-walled), DW (double walled), and MW (multi-walled) CNT. Diameters may vary from around 1 nm for SWCNT to more than 100 nm for MWCNT. Their lengths can exceed several hundred µm. Commercial CNT can often contain a	cylindrical fullerene (single or multi-walled, capped or uncapped)

Type	Description	Characteristics
	significant amount of other carbon allotropes and inorganic nanoparticle catalysts.	
Nanowires	Nanowires are small conducting or semi-conducting nanofibers with a single crystal structure, a typical diameter of a few 10s of nm and a large aspect ratio. Various metals have been used to manufacture nanowires, including cobalt, gold and copper. Silicon nanowires have also been produced. Potential applications include inter-connectors in Nano-electronic devices, photovoltaics and sensors.	large aspect ratio
Quantum dots	Quantum dots are small (2 nm to 10 nm) assemblies of semiconductor materials with novel electronic, optical, magnetic and catalytic properties. Typically containing 1,000 to 100,000 atoms, quantum dots are considered to be something between an extended solid structure and a single molecular entity. Semiconductor quantum dots exhibit distinct photo-electronic properties which relate directly to their size. For example, by altering the particle size, the light emitted by the particle on excitation can be tuned to a specific desired wavelength. Applications include catalysis, medical imaging, optical devices and sensors.	semi-conducting crystal core (e.g. CdSe, CdS core, ZnS coat)
Metals and metal oxides, ceramics	This category includes a wide range of compact forms of nanoparticles, including ultrafine titanium dioxide and fumed silica. Such nanoparticles can be formed from many materials, including metals, oxides and ceramics. Although the primary particles have compact form, these materials are often available only in agglomerated or aggregated form. They can be composites having, for example, a metal core with an oxide shell, or alloys in which mixtures of metals are present. This group of nanoparticles is generally less well defined in terms of size and shape, and likely to be produced in larger bulk quantities than other forms of nanoparticles. Applications include coatings and pigments, catalysis, personal care products, cosmetics and composites.	ultrafine powders (e.g. Ag, Au, ZnO, TiO2, CeO)
Carbon black	Carbon black is virtually pure elemental carbon in the form of particles that are produced by incomplete combustion or thermal decomposition of gaseous or liquid hydrocarbons under controlled conditions. Its physical appearance is that of a black, finely divided powder or pellet. Its use in tyres, rubber and plastic products, printing inks and coatings is related to properties of specific surface area, particle size and structure, conductivity and colour. The primary particle size of carbon black is most commonly less than 100 nm, but commercial forms are aggregated, typically with dimensions greater than 100 nm. Carbon black is one of the top 50 industrial chemicals manufactured worldwide, based on annual tonnage.	

Type	Description	Characteristics
Dendrimers	Dendrimers are polymer particles in which the atoms are arranged in a branching structure, usually symmetrically about a core. Dendrimers are typically monodisperse with a large number of functionalizable peripheral groups. They are currently being evaluated as drug delivery vehicles.	
Nanoclays	Nanoclays are ceramic nanoparticles of layered mineral silicates. Nanoclays can be naturally occurring or engineered to have specific properties. Naturally occurring forms include several classes such as: montmorillonite, bentonite, kaolinite, hectorite, and halloysite. Nanoclays also include organo-clays, i.e. clays that have been subjected to cat-ion exchange, typically with large organic molecules, which partially or completely de-laminates the primary sheets.	

17.4 Potential Hazards

There are specific issues associated that should be considered as part of the planning and risk assessment of work involving nanomaterials. Nanomaterials are generally considered more hazardous than their larger form counterparts because of the potential for nanomaterials to express property changes such as increased flammability and reactivity, from their larger counterparts and the potential of some nanomaterials to form explosive dust clouds. In addition to this, increased particle number and combined surface area, other particle characteristics might influence the biological response, including solubility, shape, charge and surface chemistry, catalytic properties, adsorbed pollutants (e.g. heavy metals or endotoxins), as well as degree of agglomeration.

17.5 SDS's and Control Banding for risk assessment.

As nanotechnology is an emerging field and the reasons described above, SDS's for nanomaterials may not adequately cover all the hazards of these materials. Due to this, research has been undertaken into what standard controls would be suitable for working with nanomaterials to reduce exposure. It has been shown that existing controls utilised for dusty processes are effective controls for use with nanomaterials. From this research a principle of control banding has been developed, which is based on an evaluation of the known health risks of the nanomaterial product and the potential exposure identify an appropriate control band. When undertaking a risk assessment for work involving nanomaterials, specialist advice may be required to identify the appropriate control band.

Conceptually, the five control band levels detailed in the ISO Standard consist of:

- CB 1: Natural or mechanical general ventilation
- CB 2: Local ventilation: extractor hood, slot hood, arm hood, table hood, etc.
- CB 3: Enclosed ventilation: ventilated booth, fume hood, closed reactor with regular opening
- CB 4: Full containment: glove box/bags, continuously closed systems
- CB 5: Full containment and review by a specialist: seek expert advice

17.6 Labelling

Manufacturers/importers have a duty to correctly classify chemicals and include information on known hazards on the label in accordance with Occupational Safety & Health & Regulations. (Part 5, r. 5.6)

Where the hazards associated with engineered nanoparticles have not been fully characterised the manufacturer/supplier should include an interim statement on the label such as:

- Contains engineered/manufactured nanomaterials. Caution: Hazards unknown; or
- Contains engineered/manufactured nanomaterials. Caution: Hazards not fully characterised.

Where engineered nanomaterials are labelled with the above phrases, they should be included on the label of any container to which the nanomaterial is decanted.

17.7 Spills

Methods to control spill and accidental release of nanomaterials should be identified in pre-planning activities. Where on-site personnel might reasonably be expected to deal with a spillage of nanomaterials, consideration may be given to the use of wet wipe cleaning methods, barriers to minimise air currents across areas affected by a spillage and tested and certified HEPA filters, for dry materials or dried spills. Dry sweeping should be avoided.

17.8 Nano waste Management

The properties of a nanomaterial must be considered when determining the appropriate method of waste disposal. Consideration needs to be given to the following characteristics:

- Type of nanomaterial or nano-product from which nanowaste is derived can effect waste characteristics. These characteristics include Flammability, Corrosivity, Reactivity ,Toxicity, Physical form (e.g. material size can effect waste characteristics)
- The sources of nanomaterial waste may include the Manufactured Nanomaterials themselves (e.g. Carbon Nanotubes), Nano By-products - organic or inorganic, Liquid Suspensions Containing Nanomaterials, Items Contaminated with Nanomaterials (e.g. Wipes/PPE), the waste of animals to which nanomaterials have been administered, Solid matrices with Nanomaterials
- Due to the above, waste containing nanomaterials may require, Separation from other waste streams, to be Bagged and sealed, to be labelled as per clinical waste protocols and ADG Code, storage on site, to be recycled where possible. For the time being, disposal of waste via incineration plants should be avoided where little is known about the behaviour or there is high concentrations of nanoparticles.

18. SECURITY RISK SUBSTANCES (SRS)

18.1 Ammonium Nitrate

The term Security Risk Substances (SRS) has been given to dangerous goods of particular security concern because their misuse may lead to mass casualties and/or destruction.

Western Australia has developed dedicated regulations for SRS under the Dangerous Goods Safety Act. The requirements of the SRS Regulations are in addition to the requirements of the other dangerous goods safety regulations and any other legislation that may apply.

Security Risk Substances are substances containing more than 45% Ammonium Nitrate, which is not an explosive or an aqueous solution consisting of a homogeneous mixture of 2 or more components in a single phase. The above substances will collectively be referred to as Security Sensitive Ammonium Nitrate (SSAN)

18.2 Licencing and Exemption

In general, the manufacture, import, export, supply, transport possession, access or use of Security Risk Substances requires a license, issued by the Department of Mines and Petroleum. An exemption to the licencing requirements for the possession of SRS exists for educational institutions (persons employed by and & students of educational institutions).

This exemption is conditional on a legitimate research, teaching or analysis requirement for the SRS that do not involve the manufacture of an illegal product and a limit of 3kg of SRS held in any laboratory/building. This is to be recorded and managed on ChemAlert. Should more than of 3kg of SRS be required, Contact the Director of Health, Safety & Emergency Management to discuss the requirement for a licence.

SRS's are considered to be a Chemical of Security Concern. Please see section 19 for recommendations on management of Chemical of Security Concern.

19. CHEMICALS OF SECURITY CONCERN

19.1 Introduction

Chemicals are legitimately used by individuals and organisations every day throughout Australia. However, a small percentage of these chemicals have been diverted and for unlawful purposes, including facilitating terrorist attacks. The Council of Australian Governments (COAG) have identified 96 chemicals as chemicals security concern, due to their potential to produce explosive or toxic weapons.

A voluntary National Code of Practice for Chemicals of Security Concern applies to 11 of the 96 Chemicals of Security Concern that are precursors to homemade explosives. Ideally the code should be applied to the additional 84 toxic chemicals of security concern as security risk management is part of good business practise. The remaining Chemical of Security Concern is Ammonium Nitrate as covered by the Dangerous Goods Safety (Security Risk Substance) regulations 2007 (see Section 18). The National Code of Practice for Chemicals of Security Concern outlines measures to increase responsibility, security, monitoring of inventory and the reporting of suspicious behaviour.

19.2 Chemicals covered by the code

Table 8: Chemical covered by the National Code of Practice for Chemicals of Security Concern.

Chemicals of Security Concern	
Security Risk Substances Ammonium Nitrate (Section 18)	> 45% Ammonium Nitrate, which is not an explosive or an aqueous solution consisting of a homogeneous mixture of 2 or more components in a single phase.
11 precursor chemicals Ammonium perchlorate Hydrogen peroxide Nitric acid	 ≥ 65% or pure aqueous solution ≥ 10% All pure aqueous solutions, mixtures with other chemicals ≥15% ≥ 30%

Nitromethane Potassium chlorate Potassium nitrate Potassium perchlorate Sodium azide Sodium chlorate Sodium nitrate Sodium perchlorat	≥ 10% ≥ 65% or pure aqueous solution ≥ 10% ≥ 65% or pure aqueous solution ≥ 10% ≥ 65% or pure aqueous solution ≥ 10% ≥ 95% ≥ 65% or pure aqueous solution ≥ 10% ≥ 65% or pure aqueous solution ≥ 10% ≥ 65% or pure aqueous solution ≥ 10%	
84 toxic chemicals Aldicarb Aluminium phosphide Ammonia (anhydrous) Arsenic pentoxide Arsenic trioxide Arsine Azinphos methyl Bendiocarb Beryllium sulfate Bromine Cadusafos Calcium cyanide Carbofuran Carbon disulphide Carbon monoxide Chloropicrin Chlorfenvinphos Chlorine Cyanogen bromide Cyanogen chloride Diazinon Dichlorvos Diethyl phosphite Dimethyl phosphite Dimethyl mercury Dimethyl sulfate Disulfoton	 Endosulfan Ethion Ethyl mercury chloride Ethyldiethanolamine Hydrochloric acid Hydrogen chloride Hydrogen cyanide Hydrogen sulphide Magnesium phosphide Mercuric chloride Mercuric nitrate Mercuric oxide Mercurous nitrate Mercury cyanide Methamidophos Methidathion Methiocarb Methomyl Methyl fluoroacetate Methyldiethanolamine Mevinphos Nitric oxide Omethoate Osmium tetroxide Oxamyl Paraquat Parathion methyl	 Perchloric acid Phorate Phosgene Phosphine Phosphorus Phosphorus oxychloride Phosphorus pentachloride Phosphorus trichloride Potassium cyanide Propoxur Sodium cyanide Sodium fluoroacetate Strychnine Sulfur dichloride Sulfur monochloride Sulphuric acid Terbufos Thallium sulfate Thionyl chloride Thiophosphoryl chloride Triethanolamine Triethyl phosphite Trimethyl phosphite Zinc cyanide Zinc phosphide

19.3 Application of the Code in Universities

Universities Australia developed a National Code of Practice for Chemicals of Security Concern - guidance note for laboratories - in universities, health or industry. The guidance outlines advice for implementing the code in laboratory based workplaces. The advice is separated into 3 sections. The importance of the National Code of Practice for Chemicals of Security Concern and the controls in place should form part of your training & induction programme.

1. The overarching responsibility for integrating the Code of Practice for Chemicals of Security Concern sits with someone in a position to implement and promote the code. As part of organisational risk assessment the assessment of security risk and implementation of security measures should be considered together with ensuring that personnel who are able to order chemicals are verified as trustworthy people, making laboratory mangers & supervisors aware of the code, the importance of reporting suspicious behaviour and reviewing waste disposal procedures. At Curtin this is the Director of Health, Safety & Emergency Management.

2. Laboratory Managers can implement the Code of Practice by a risk assessment approach that may include the following controls. Reviewing security measures, ensuring that chemicals are stored in a secured area, restricting access arrangements to those who have a legitimate need, maintaining an accurate inventory, being familiar with and encouraging supervisors to be familiar with the chemicals and volumes being used by students and technicians & limiting the number of people authorised to purchase chemicals.

3. Laboratory Managers and Supervisors can implement the Code of Practice using a risk assessment approach and may include strategies around reviewing inventory recording systems to enable regular interactive and accurate monitoring, Appointing people with appropriate responsibility to regularly reconcile inventory and report any unexplained discrepancies

19.4 Reporting

Report any suspicious activity or unexplained discrepancies to the Director - Health, Safety and Emergency Management extension 2137. They will then contact the National Security Hotline.

20. SCHEDULED POISONS

20.1 Scheduled Poisons, Medicines and Drugs

The Poisons Act 1964 regulates and controls the possession, sale and use of poisons, medicines and drugs to protect the public from harm associated with the misuse of these substances.

Poisons, medicines and drugs controlled under the Poisons Act 1964 (WA) are classified into Schedules (listed below) based on their toxicity, use and potential for misuse. The Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) is the legislative instrument that has been adopted as the list of poisons classified into each schedule. Many poisons by their nature are also hazardous or dangerous and as such the requirements of the Poisons Act 1964 are in addition to those of other applicable legislation unless specifically stated. The Schedules of a poison can also be found on the SDS, where available.

20.2 Definition of Schedules

The Schedules as defined in the Poisons Act 1964 are:

- Schedule 1, currently not used.
- Schedule 2, Pharmacy Medicine; medicines available to the public from pharmacies or where there is no pharmacy service available, from persons licensed to sell Schedule 2 poisons.
- Schedule 3, Pharmacist Only Medicine; medicines sold by retail under the supervision of a pharmacist or supplied by medical practitioners, dentists or veterinary surgeons

- Schedule 4, Prescription Only Medicine OR Prescription Animal Remedy; medicines that are supplied on prescription from a pharmacy or by a medical practitioner, dentist, veterinary surgeon, or nurse practitioner.
- Schedule 5, Caution poisons of a hazardous nature that must be readily available to the public, but require caution in handling, storage and use.
- Schedule 6, Poison poisons that must be available to the public, but are of a more hazardous or poisonous nature than those included in Schedule 5.
- Schedule 7, Dangerous Poison; poisons that require special precautions in manufacture, handling, storage or use, or special individual regulations regarding labelling or availability.
- Schedule 8, Controlled Drugs; and prescription medicines which require restriction of manufacture, supply, distribution, possession and use to reduce abuse, misuse and physical or psychological dependence.
- Schedule 9, Prohibited Substances; poisons that are drugs of abuse, the manufacture, possession, sale or use of which should be prohibited by law except for amounts which may be necessary for educational, experimental or research purposes conducted with the approval of the Governor.

20.3 Poisons Permit

To purchase, use and hold poisons in schedules 2, 3, 4, 7, 8, or 9, Curtin must hold an appropriate permit for either research, educational, or industrial purposes. The purchase, use or holding of Schedule 5 and 6 Poisons do not require a permit.

The permit must be held by a person (nominated by the School/Department) with sufficient education or experience in the handling of Poisons (Generally this is a tertiary qualification or 5 years' experience, relevant to the poisons listed on the permit). Permit holders are responsible for ensuring that all permit conditions are met. Staff who require the purchase, access and use scheduled poisons must be authorised to do so by the permit holder

Permits are only valid for the named poisons/schedules and locations. Manufacture, distribution, sale or supply of Scheduled Poisons is prohibited under these permits. Schedule 9 substances may only be used with the gazetted approval of the Department of Health CEO for certain research and teaching purposes. Applications for Schedule 9 substances are separate authority.

Permits may outline additional conditions for use, storage, and record keeping for individual poisons or entire schedules. Permits may also detail any limitations on the size or quantity allowed under the permit. Poisons covered under a Poisons Permit cannot be used for purposes other than those for which the permit has been granted.

Please contact the Hazardous Substance Advisor (HSA) for enquiries about applying for a new Poisons Permit or the amendment of an existing poisons permit. Please visit the Poisons website for contact details of the Hazardous Substance Advisor. http://research.curtin.edu.au/research-integrity-ethics/poisons/

This section does not include the legal requirements and obligations for prescribing and administering drugs/medications to people (including authorised personnel and labelling). The use of scheduled poisons in human or animal research must be approved by the corresponding ethics committee.

20.4 Purchase

It is a requirement for a permit to be in place prior to the purchase of the scheduled poisons above. Permits must either list the chemicals being used on the permit or list the relevant schedule for them to be compliant. Suppliers are required to ensure the appropriate permit is held by Curtin prior to the supply of scheduled poisons requiring a permit.

All purchases of Scheduled poisons must follow Curtin's chemical pre-purchasing check list (Section 8). The purchase should be made by the Permit holder or as a minimum the permit holder must provide authorisation for the purchase.

20.5 Storage & Access Arrangements

All Scheduled Poisons must be stored securely. Additional conditions for storage may be stipulated in Individual Permit conditions.

As a minimum Schedule 4 Poisons must be stored within a locked room or dedicated locked cupboard/cabinet, with unauthorised access only.

Where a Scheduled poison requiring a permit is also a dangerous goods (i.e. Schedule 7 Poisons) it must also be stored securely in addition to the Dangerous Goods Safety storage requirements outlined in **Section 10.2**

Schedule 8 and 9 substances these must be located within an approved safe. (The safe must meet the requirements of Appendix M of the Poisons Regulations 1965 or the approval of the WA health department).

20.6 Record Keeping Poisons

Schedule 4 poisons require purchase and usage records to be kept. The records should be detailed enough so that discrepancy of use, lost or stolen poisons would be reasonably detected.

Schedule 8 and 9 poisons require records of purchase and usage and destruction to be kept in a dedicated record book obtained from the supplier. Inventory records must be entered at least monthly.

20.7 Labelling

Schedule poisons when packaged and sold solely for dispensary, industrial, laboratory or manufacturing purposes should be labelled according to the requirements of (Section 9)

When packaged for consumer usage (i.e. prescribed medicines), scheduled poisons must be labelled according to the labelling requirements of the SUSMP – Standard for the uniform scheduling of Medicines and Poisons.

The labelling requirements for decanted drugs, poisons and controlled substances must follow the decanted labelling requirements outlined in (Section 9.7.3)

20.8 Disposal

Poisons must be disposed of without creating risk to the public. Schedule 8 poisons can only be destroyed by or under the supervision of a person authorised by the Poisons Regulations.

21. CONCESSIONAL SPIRITS

Undenatured ethanol (alcohol) can attract an excise under the Excise Act.

Curtin University currently has an exemption from the excise due to the low volume of ethanol use, although records must still be kept for a minimum of 5 years. The records must include:

- Amount of ethanol held;
- Amount of ethanol obtained;
- Date the ethanol was obtained;
- Name of supplier; and
- Purposes for which the ethanol is used.
- More information on concessional spirits is available from the Australian Taxation Office website.

22. HEALTH SURVEILLANCE

The Occupational Safety and Health Regulations 1996 list some specific hazardous substances under Schedule 5.3 that require health surveillance where there is a risk to health from exposure to any of the listed substances. The type of surveillance for each substance is outlined in the regulations. (**Section 7.5**)

Schedule 5.3 substances:

- Acrylonitrile
- Inorganic Arsenic
- Asbestos
- Benzene
- Cadmium
- Inorganic Chromium
- Creosote
- Isocyanates
- Inorganic Mercury
- 4,4'methylene bis(2-chloroaniline) (MOCA)
- Organophosphate pesticides
- Pentachlorophenol (PCP)
- Polycyclic aromatic hydrocarbons (PAH)
- Crystalline silica
- Thallium
- Vinyl chloride

This is not an exhaustive list of the hazardous substances for which health surveillance should be considered. Health surveillance should be provided when risk assessment indicates that exposure to a chemical presents a reasonable likelihood that adverse health conditions could occur under particular conditions and there is a scientifically validated method available to monitor it.

The initial surveillance must occur prior to the commencement of work and further surveillance during and/or after the period of work involving the substance. Curtin has an approved medical practitioner at Curtin Health Services who can provide health surveillance. Health surveillance records are treated as confidential and must be kept for 30 years. The employer must cover the cost of health surveillance. If health surveillance is required, contact the Hazardous Substance Advisor for information.

23. SCHEDULED CARCINOGENS

23.1 Chemical Carcinogens

Carcinogenic chemicals are hazardous substances that may cause cancer. Three schedules of carcinogenic chemicals have been declared under The Occupational Safety and Health Regulations 1996 (WA). If the use of a scheduled carcinogen is required, contact the Hazardous Substance Advisor for information about application to the Commissioner of WorkSafe. Applications will require a justification of the use of the substance and a detailed risk assessment of the proposed work. The Commissioner may stipulate further conditions or restrictions on the use of the carcinogenic substance.

The scheduled substances below are not an exhaustive list of carcinogens. If a chemical is classified as carcinogenic, a thorough risk assessment should be performed.

The listed carcinogenic substances are subject to the scheduled restrictions as a pure substance; or in a mixture containing 0.1% or more of that substance determined as a weight/weight (w/w) concentration for solids or liquids, or a volume/volume (v/v) concentration for gases. They must not be used without the approval of the Commissioner of Worksafe.

23.2 Carcinogenic substances only to be used for bona fide research

The listed Schedule 5.4 substances have been identified as Carcinogenic substances to be used only for bona fide research under the Occupational Safety & Health Regulations 1996. The Commissioner must be notified of the intention to use a Schedule 5.4 carcinogenic substance in the workplace prior to the commencement of work.

Schedule 5.4 Substances

- 2-Acetylaminofluorene
- Alfatoxins
- 4-Aminodiphenyl
- Benzidine and its salts
- Bis(chloromethyl) ether
- Chloromethyl methyl ether (technical grade)
- 4-Diaminoazobenzene
- 2-Napthylamine and its salts
- 4-Nitrodiphenyl

23.3 Carcinogenic substances only to be used for purposes approved by the commissioner

The listed Schedule 5.5 substances have been identified as requiring approval by the Commissioner of Worksafe under the Occupational Safety & Health Regulations 1996. This approval must be obtained prior to the commencement of work.

Schedule 5.5 Substances

- Acrylonitrile
- Benzene (when used as a feedstock and containing more than 50% benzene by volume)
- Cyclophosphamide [(a cytotoxic drug) when used in preparation for therapeutic use in hospitals and oncology treatment facilities and in manufacturing operations]
- 3,3-Dichlorobenzidine and its salts (including 3,3-dichlorobenzidine dichloride)
- Diethyl sulphate
- Dimethyl sulphate
- Ethylene dibromide (when used as a fumigant)
- 4-4'-Methylene bis(2-chloroaniline) – (MOCA)
- Beta-Propiolactone (2-propiolactone)
- O-Toluidine and O-Toluidine hydrochloride
- Vinyl Chloride Monomer

23.4 Carcinogenic substances – Asbestos

The listed Schedule 5.6 substances have been identified as requiring approval by the Commissioner of Worksafe under the Occupational Safety & Health Regulations 1996. This approval must be obtained prior to the commencement of work.

Schedule 5.6 Substances

- Actinolite asbestos
- Amosite (brown asbestos)
- Anthophyllite asbestos
- Crocidolite (blue asbestos)
- Chrysotile (white asbestos)
- Tremolite asbestos

23.5 Access, Health Surveillance & Records

Access to scheduled carcinogens should be restricted to staff or students who:

- work directly with the scheduled carcinogens;
- have received chemical training; and
- have been fully briefed on the chemical risk assessment.
- Restricted areas should display appropriate signage (check MSDS).

Health surveillance is required for scheduled carcinogens and an MSDS will provide some initial advice on the types and frequency of health tests required. Additional advice should be sought from the University's Health Services Medical Director.

Records must be maintained and kept for each person who works with a scheduled carcinogenic substance. The records must contain:

- the person's full name;
- the person's date of birth;
- the person's residential address during the period that the person worked with the scheduled carcinogenic substance;
- the name of each scheduled carcinogenic substance that the person worked with; and
- the period of time over which the person worked with each of the scheduled carcinogenic substances. A written copy outlining the above details must be given to each person who works with a scheduled carcinogenic substance on leaving Curtin.

24. AGRICULTURAL AND VETERINARY CHEMICALS

24.1 Introduction

In addition to the general chemical management requirements, there are additional legislative requirements for agricultural and veterinary chemicals under the Agricultural and Veterinary Chemicals Act 1995 & Regulations 1995. The WA government departments that control the use of agricultural and veterinarian chemicals regulation in WA are the Department of Agriculture and Food and the Department of Health WA.

All agricultural and veterinary products or their active constituent sold in Australia must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA) which provides approval for a product for the purpose and use as stated on the label.

24.2 Purchase

All chemical purchases require a Chemical or Gas Pre-purchase Checklist to be completed. Due to the nature of the products, many agricultural & veterinary products are also scheduled poisons. Please refer to (section 20) for more information about the requirements for poisons.

24.3 APVMA Research Permits for off label use

Use of an agricultural or veterinary chemical other than as directed by the label is termed 'off label' use and requires an APVMA research permit. A Public chemical Registration Information System Search (PubCRIS) is maintained on the APVMA website. https://portal.apvma.gov.au/pubcris . Contact the Hazardous Substance Advisor if you require a permit.

24.4 Usage Restrictions for Agricultural or Veterinary purposes.

There are controls on the use of agricultural & veterinary chemicals for Agricultural and Veterinary practices to protect people, animals, crops, and the environment. They cover aspects such as spray drift, overuse and maximum residue levels and withholding periods for agricultural produce. If an agricultural & veterinary chemical is required for research into agricultural or veterinary practices or produce, additional licensing or permit requirements may apply.

Permits to use agricultural chemicals including herbicides, fungicides, baits and poisons, and insecticides are regulated by the Department of Agriculture and Food https://www.agric.wa.gov.au/ and the Department of Health WA www.health.wa.gov.au/ in conjunction with APVMA.

24.1.1 Veterinary Drugs and Poisons Permits

Veterinary practitioners are authorised to obtain, possess, use or supply most drugs and poisons for the lawful practice of their profession, i.e. for the veterinary treatment of animals under their care. You will need to provide proof that you are a registered veterinarian and that you hold the required poisons permits to purchase many veterinarian pharmaceuticals.

24.5 Labelling

Manufactures must ensure that Agricultural and veterinary chemicals have a label in English that complies with the requirements of the Australian Pesticides and Veterinary Medicines Authority and also includes the following:

any hazard statement that is consistent with the correct classification of the chemical, and

any precautionary statement that is consistent with the correct classification of the chemical.

24.6 Health Surveillance

The use of certain agricultural chemicals may require health surveillance. This is particularly relevant to pesticides that contain organophosphates and or benzenes. For information about health surveillance see section 22.

24.7 Legislation

24.7.1 Acts and Regulations

- Agricultural and Veterinary Chemicals Code Act 1994 (Cth)
- Agricultural and Veterinary Chemicals Code Regulations 1995 (Cth)
- Agricultural and Veterinary Chemicals Act 1995 (WA)
- Agricultural and Veterinary Chemicals Regulations 1995 (WA)
- Poisons Act 1964 (WA)
- Poisons Regulations 1965 (WA)

24.7.2 Supporting Standards, Codes and Guidance Materials

- AS 2507: The storage and handling of agricultural and veterinary chemicals
- Code of Practices for the use of Agricultural and Veterinary Chemicals in Western Australia

25 ILLICIT DRUG PRECURSORS

25.1 Introduction

In addition to the general chemical management requirements, there are additional legislative requirements for precursor chemicals and ancillary equipment known to have been used for the manufacture of illicit drugs under the Misuse of Drugs Act 1981 & Regulations 1982.

Two categories of precursor substances and ancillary materials known to have been used in the manufacture of drugs are listed in the Misuse of Drugs Act 1981 & Regulations 1982. Stricter controls applied to Category 1 Items. Research & Education Institutions are exempt from some possession and supply restrictions, however purchase controls still apply.

25.2 Category 1 Items and purchase controls

Category 1 items (substances and things) are listed in Schedule 3 of the Misuse of Drugs Act Regulations 1982. Purchasers of Category 1 items will be required to hold an account with the supplier, provide a written order for the item, fill out an end user declaration and provide sufficient evidence of identity on order and receipt of the item. Suppliers will not supply a Category 1 item with 24 hours of ordering, during which time the supplier must provide a copy of the end user declaration to the Commissioner of Police.

Table 9 - Category 1 items under the Misuse of Drugs Act Regulations 1982, Schedule 3.

Division 1 — Substances

Chemical name	Alternate name	Quantity substance in seized sample
Acetic anhydride		50 ml
Acetyl Chloride		50 ml
4-Amino-Butanoic acid	Piperidinic acid	
Bromobenzene	Phenylbromide	
Bromo safrole		
Boron tribromide		
1, 4-Butanediol	Tetramethylene Glycol	
1-Chlorophenyl-2-aminopropane		
L-Ephedrine (including salts)	Ethyl phenyl	37 g
Ethyl phenyl acetate	Benzene acetic acid, ethyl ester, methylbenzyl acetate	
Gamma butyrolactone		3.5 ml

Chemical name	Alternate name	Quantity substance in seized sample
Gamma hydroxybutanoic acid (including salts)	Gamma hydroxybutyric acid	
Hydroiodic acid	Hydrogen iodide	250 ml
4-Hydroxybutanal	4-Hydroxy butyraldehyde	
2-Hydroxytetrahydrofuran	Tetrahydro-2-furanol	
4-Hydroxy-butanoic acid lactone	Gamma-valerolactone	
4-Hydroxy-butanoic acid nitrile	4-Hydroxy butyronitrile	
4-Hydroxy pentanoic acid	Gamma Valerolactone	
Hypophosphorous acid	Phosphinic acid	39 ml
Iodine (including iodide salts)		30 g
Methcathinone	Ephedrone	
3, 4-Methylenedioxyphenylpropan-2-one		
N-Methyl ephedrine		
Methyl phenyl acetate	Benzeneacetic acid, Methyl ester, Benzyl Acetate	
N-Methylpseudoephedrine		
Norpseudoephedrine		
2-Pyrrolidone Gamma-butyrolactam		
Phenylacetamide		
Phenylacetic acid (including salts and esters)		33 ml
Phenylacetonitrile	Benzyl cyanide, Benzeneacetonitrile Benzyl nitrile	
Phenylacetyl chloride		
1-Phenyl-2-chloropropane		

Chemical name	Alternate name	Quantity substance in seized sample
1-Phenyl-2-nitropropene		
Phenylpropanolamine	Norephedrine	
1-Phenyl-1-Propanone	Phenylethylketone Propiophenone	
1-Phenyl-2-propanone	Benzyl methyl ketone Phenylacetone	39 g
1-Phenyl-2-propanone oxime		
1-Phenyl-2-propanol		
Phosphorus red/white		19 g
Phosphorous acid	Phosphonic Acid	
Pseudoephedrine (including salts)		37 g
Pyridine		

Division 2 — Things

Item	Description
1	Any storage device containing ammonia gas where the mass of the storage device is less than one tonne.

25.3 Category 2 Items and purchase controls

Category 2 items (substances and things) are listed in Schedule 4 of the Misuse of Drugs Act Regulations 1982. Purchasers of Category 2 items will be required to either hold an account with the supplier and provide a written order for the item or alternatively fill out an end user declaration and provide evidence of identity on order and receipt of the item. Copies of end user declarations for Category 2 items will be provided to the Commissioner of Police as soon as practicable.

Table 10 - Category 2 items under the Misuse of Drugs Act Regulations 1982, Schedule 4.

Division 1 — Substances

Curtin University

Chemical name	Alternate name	Quantity of substance in seized sample
N-Acetylanthranilic acid	0-Acetamidobenzoic acid	
Allylbenzene	3-Phenyl-1-propene, 2-Propenyl Benzene	
Ammonium formate		
Anthranilic acid	2-Aminobenzoic acid	
Benzaldehyde		
Benzyl chloride	a-Chlorotoluene	
Benzyl bromide	a-Bromotoluene	
Alkali metal - Calcium		
Chromic acid (including salts)		
Chromium trioxide	Chromium (VI) oxide	
Ergometrine	Ergonovine	
Ergotamine		
Ethanamine	Monoethylamine	
N-Ethylephedrine		
N-Ethylpseudoephedrine		
Formamide		
Hydrobromic acid	Hydrogen bromide solution	
Hypophosphite salts		
Isosafrole	1, 3-Benzodioxole, 5-(1-propenyl)	
Alkali metal - Lithium		7 g
Lysergic acid		
Alkali metal - Magnesium		
Methylamine (& gas)	Aminomethane/Monomethylamine	135 ml
Methylammonium salts		
N-Methylformamide		
Palladium (including salts)		
Phenylalanine		
Piperidine		

Chemical name	Alternate name	Quantity of substance in seized sample
Piperonal	3,4-Methylenedioxy-benzaldeyde, Heliotropine	50 g
Alkali metal - Potassium		
Propionic anhydride		
Raney nickel		
Safrole	5-(2-Propenyl)-1, 3-Benzodioxide	69 ml
Sassafras oil		91 ml
Sodium Borohydride		
Alkali metal - Sodium		24 g
Thionyl chloride		
Thorium (including salts)		

Division 2 — Things

Description	Details
Gas cylinder containing hydrogen sulphide gas	
Gas cylinder containing hydrogen gas	
Gas cylinder containing methylamine gas	

Description	Details
Round bottom reaction flask	Capacity 500 ml or greater (including the repair or modification)
Condenser	Joint size B19 or greater
Splash heads and distillation heads	

Description	Details
Heating mantles	Capacity 500 ml or greater (including the repair or supply of parts)

Description	Details
Encapsulators (Capsule filling machines)	Manual or mechanical
Pill presses (including a part for a pill press)	Manual or mechanical
Rotary evaporators	

25.4 Legislation

- Misuse of Drugs Act 1981 (WA)
- Misuse of Drugs Regulations 1982 (WA)
- Code of Practice for Supple Diversion into Illicit Drug Manufacture (PACIA)

26. RADIOACTIVE CHEMICALS

26.1 Scope

The general chemical management requirements are relevant to the management of radioactive chemicals. Additional requirements for radioactive chemicals are identified in this section.

26.2 Introduction

Radioactive chemicals, also referred to as radionuclides or radioisotopes, spontaneously emit radiation. If they are not encapsulated they may also be referred to as open or unsealed sources. Radioactive chemicals are often supplied as a single chemical element isotope. For example, phosphorus has a number of radioactive isotopes including phosphorus-32 or phosphorus-33. Radioactive materials are defined in regulation 5 of the Radiation Safety (General) Regulations 1983 (WA). Details of Radiation Safety Management at Curtin can be found at http://research.curtin.edu.au/research-integrity-ethics/radiation-safety/.

26.3 Legislation

26.3.1 Acts and Regulations

- Radiation Safety Act 1975 (WA)
- Radiation Safety (Qualifications) Regulations 1980 (WA)
- Radiation Safety (General) Regulations 1983 (WA)
- Radiation Safety (Transport and Radioactive Substances) Regulations 2002 (WA)

26.3.2 Supporting Standards, Codes and Guidance Materials

- AS 2243.4: Safety in laboratories. Part 4: Ionizing radiations
- Radiation Protection Series (RPS) published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

26.4 Registration

The Radiation Safety Act 1975 (WA) requires Curtin University to hold a Certificate of Registration for the possession and use of all radiation sources. The University's Registration is centrally controlled and maintained by Curtin University's Radiation Safety Officer (RSO), reporting to the University Radiation Safety Committee. The RSO is responsible for instituting and maintaining a system of radiation safety at the University, which includes maintaining registration limits of all radiation sources used by Curtin and coordinating modifications to the current registration.

26.5 Licensing

The Radiation Safety Act 1975 (WA) requires individuals working with radioactive chemicals to hold, or work under the supervision of someone holding, a radioactive substances licence. Licences are obtained from the Radiation Health branch of the WA State Government Department of Health. Initial applications for a licence must be forwarded to the University RSO who will confirm eligibility and write a letter of support for the applicant. Subsequent licence renewals can be forwarded directly to the Radiation Health Branch. For further details see http://research.curtin.edu.au/research-integrity-ethics/radiation-safety/licencing-and-training/.

26.6 Responsibilities

The responsibility for implementation of the safe management of radioactive chemicals rests with the Heads of Schools, managers and supervisors. Each workplace is responsible for enforcing the procedures and for ensuring that staff and students have the necessary information, instruction, training and supervision before commencing radiation work. To assist Heads of School, managers and supervisors, each area nominates local radiation safety representatives to liaise with both local Health & Safety personnel and the University RSO. These representatives are listed at http://research.curtin.edu.au/research-integrity-ethics/radiation-safety/radiation-safety-contacts/.

26.7 Radioactive Substances Project Approval

All Supervisors of projects involving radioactive substances at the University are required to complete a radioactive substances project application. The application must be completed and sent to the University Radiation Safety Officer (RSO) for final approval. Further details and application forms can be found at http://research.curtin.edu.au/research-integrity-ethics/radiation-safety/radiation-project-applications/.

26.8 Training

All radioisotope users at the University are required to have a level of training appropriate to the work they are conducting. This training can be one of the WA Regulator accredited courses or an equivalent level qualification. The licence holder must retain documentary evidence of the training of each user under his/her supervision. The University RSO can provide further information related to accredited courses.

26.9 Ordering Radioactive Material

A radioactive substances project application (or amendment) must be submitted before any new purchase of radioactive chemical, as some facilities may require modifications to accommodate certain radionuclide activity levels. Maximum activities for each radioisotope are registered at each location so it is important to ensure the total activities remain below these limits. For repeat orders of radioactive chemicals already covered by an existing approved project it is only necessary to inform the local radiation safety representative to ensure activity limits for the location are not exceeded. The RSO should be contacted if the limits at any location need to be changed.

26.10 Records and Labelling

Records following the movement of radioactive substances must be kept and regularly updated. Records must detail activities, physical form of radioisotopes, supplier, arrival date, use details, disposal method and disposal date. Comments could also be included on the form of packaging and, if necessary, the quality of the packaging. Signed receipts should be obtained. The container and the storage location should be clearly marked with a radiation tri-foil symbol. Decanted radioactive chemicals must be written in English, include the product identifier and the activity. Locations and activities of all stored radioisotopes should be kept and forwarded to the RSO for registration purposes.

26.11 Monitoring and Testing

The objective of radiation monitoring is to ensure that existing safety procedures are effective at keeping dosage and exposures from scattered or incidental radiation as low as reasonably achievable (ALARA). Monitoring and Testing techniques include personal radiation monitoring badges, biological monitoring, and wipe testing and radiation surveys. All radioisotope laboratories should adopt one or more of these techniques appropriate for the work being conducted. Details about the most appropriate technique(s) can be found at http://research.curtin.edu.au/research-integrity-ethics/radiation-safety/radiation-monitoring/.

26.12 Waste Disposal

All solid radioactive chemical waste must be put in a thick-walled plastic liner and subsequently placed in a sturdy cardboard box. Different radioisotopes should not be mixed in the same box. The box should be labelled with the radioisotope, the activity, the date, a contact name and department. These wastes will need to be delivered to the Curtin Radioactive Waste Store. The RSO should be contacted to arrange this disposal. Liquid waste should be disposed of using a flushing sink in a registered radioisotope laboratory. The activity flushed must be within the regulatory limits.

27. HEALTH & SAFETY DOCUMENTS & FORMS

27.1 University Documents & Forms

For further advice on managing risks in university workplaces, including procedures, guidance, forms and training courses, please look at the Health, Safety & Emergency Management website for the following information and more:

- Health and Safety Policy
- Health and Safety Responsibilities Procedures
- Health and Safety Management Standards
- Pre-purchase checklist for Chemicals
- Pre-purchase checklist for Gases
- Pre-purchase checklist for Materials
- Pre-purchase checklist for Plant and Equipment
- Generic Risk Assessment Template
- Safe Working Procedure template
- Chemical Spill Guidelines
- Chemical Safe Work Procedure

Chemical Spill Management

Workplace Inspection Checklist

Induction Checklist

Waste Disposal Manifest

Guidance notes for Waste disposal

Guidelines for Waste Disposal

First Aiders

28. REVISION AND UPDATES

This management plan has been developed as a living document that reflects the changes in legislation, standards and guidelines available. This plan will therefore be subject to periodic review and new editions published. It is important that readers assure themselves that the current management plan is being referenced and that current standards including any amendments, legislation and/or guidance are being used.

As a minimum it is intended this document will be updated every 3 years.

Throughout this document various web links have been provided to Curtin's internal documents and other third party documents. These links are subject to change with updating information. Every effort will be made to ensure internal Curtin University links remain active. Curtin University has no control over external websites and/or documentation. If a link does not work it is recommended going to the home page of the website being referenced and search for the required document.

28.1 Revision History

Revision #	Date	Amendment Description
Version 1	19/07/2016	Issued for use