University of South Australia

WHS PROCEDURE

Safe Management of Chemicals

1. Purpose

This procedure outlines the planned arrangements for the safe management of chemicals in our university workplaces and applies to all University staff and research students storing, handling or using chemicals for research, teaching or support services.

The procedure is prepared with reference to regulatory requirements set out in the WHS Regulations 2012 (SA) and the following Safe Work Australia Approved Codes of Practice:

- How to Manage Work Health and Safety Risks
- Managing Risks of Hazardous Chemicals in the Workplace
- Labelling of Workplace Hazardous Chemicals
- Preparation of Safety Data Sheets for Hazardous Chemicals.

This procedure is to be read in conjunction with the above Codes and the following University of South Australia procedures:

- Managing Workplace Health and Safety Risks
- Purchasing and Safety
- Safe Operating Procedure development.

In designing and implementing local arrangements for safe use of chemicals refer as applicable to the best practice guidance specified in relevant Australian Standards.

2. Definitions

ADG Code – the Australian Code for the Transport of Dangerous Goods by Road or Rail ('Australian Dangerous Goods Code') 7th Edition.

Class label – means the pictogram described in the ADG Code for a class of dangerous 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.

Dangerous substance – is a hazardous chemical that is defined by the Dangerous Substances Act, 1979, to be dangerous. Dangerous goods are classified on the basis of immediate physical or chemical effects that may impact on people, property or the environment – explosive, flammable, corrosive, chemically reactive, highly combustible, acutely toxic, radioactive or infectious.

Dangerous goods class – is the class allocated to a substance under the ADG Code.

GoldFFX – an SDS database and chemicals management system provided by the Chemwatch company and adopted as the chemicals safety management software for use in the University of South Australia.

Hazardous substances – a term used under the old Australian chemical classification system formerly administered by Safe Work Australia. From 1 January 2017 the Globally Harmonised System (GHS) applies.

GHS - Globally Harmonised System of Classification and Labelling of Chemicals. The WHS Regulations implement a system of chemical hazard classification, labelling and SDS requirements based on the GHS.

Gold SDS – a 'third party' Safety Data Sheet prepared by Chemwatch on a chemical material and listed on the *GoldFFX* database, usually along with the vendor SDS. A **Mini SDS** is a summarised version of a Gold SDS prepared by Chemwatch and made available on *GoldFFX*.

Hazardous chemicals – are substances, mixtures and articles used in the workplace that represent health and /or physicochemical hazards. Health hazards are posed by irritants, carcinogens or respiratory sensitisers (formerly known as 'hazardous substances'). Physicochemical hazards result from substances which are flammable, corrosive, oxidising or explosive ('dangerous substances'). The term 'hazardous chemicals' refers collectively to both the former hazardous substances and to dangerous substances or goods.

Health monitoring – means monitoring a person to identify changes in the person's health status because of exposure to certain substances. Health monitoring must be supervised by a registered medical practitioner with experience in health monitoring.

Label – the 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.

Major or high risk spill; minor or low risk spill – The level of spill is determined by the hazards of the chemicals involved, any immediate risks to the individuals involved, how readily the spill can be contained, and how easily it can be cleaned up. Major spills refer to the more serious spills where specialist chemical advice is needed and/or where building evacuation needs to occur and emergency services called.

Safety Data Sheet (SDS) – contains information on the identity of a product and any hazardous ingredients, potential health effects, toxicological properties, physical hazards, safe use, handling and storage, emergency procedures, and disposal requirements specific to the chemical. These sheets are obtained through the *GoldFFX* database or directly from the vendor. Be aware of possible differences between the vendor's SDS and a 'third party' SDS such as that produced by Chemwatch. SDS prepared in the older format, now phased out, were referred to as Material Safety Data Sheets (MSDS).

Self-Contained Breathing Apparatus (SCBA) – An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Spill – In the context of this procedure includes the consequent production of airborne hazardous chemicals in the form of fumes, aerosols, vapours or gases (including asphyxiants). The term is not intended to encompass small-scale splashes or the uncontrolled release of compressed gases.

Vendor – the term used in *GoldFFX* referring to the manufacturer, supplier or importer of the chemical material. Under the WHS Regulations a vendor SDS must be available.

3. Roles and Responsibilities

University roles and responsibilities for managing workplace health and safety risks, including those risks associated with hazardous chemicals, are set out in the university procedure: *Managing Workplace Health and Safety Risks*.

Where a university 'workplace' is allocated a responsibility for an action, this term refers collectively to the Executive Dean or Director supported by all others with a safety responsibility in that workplace, whether that is supervisors, principal researchers, laboratory managers, technical staff, researchers or general academic and professional staff.

4. Procedure

4.1 Chemwatch '*GoldFFX*' chemical safety management software

GoldFFX is a web-based Safety Data Sheet (SDS) database and chemical management system supplied by the Chemwatch company. *GoldFFX* has been endorsed by senior management as the chemical management software to be adopted university-wide for accessing Safety Data Sheets (SDS) and maintaining chemical store manifests.

All university staff and students have access to *GoldFFX* via the staff portal or the student portal. General staff and student users using the autologin are able to access hazard information on chemicals eg SDS, miniSDS and labels. Authorised users with passwords can access the full version of *GoldFFX* for viewing and maintaining chemical stores and manifests. Contact your local Chemwatch super user if you require password access to *GoldFFX*. (For a list of super users visit the Safety & Wellbeing website.)

As the amounts of chemicals present in the University for notification and licensing requirements are monitored using *GoldFFX*, it is essential that all university workplaces enter all hazardous chemicals in *GoldFFX* with the maximum quantity recorded, and the dangerous goods classification manually entered if a Chemwatch SDS is not yet available.

For chemical users using *GoldFFX* to refer to SDS and set up manifests, Chemwatch has integrated guidance and information which assists compliance and effective management of chemical risks.

4.2 Training

All staff and research students with potential for exposure to hazardous chemicals, and those supervising others using hazardous chemicals, shall as a minimum requirement complete the applicable university online learning program(s):

- Working Safely with Hazardous Chemicals in the Workplace
- Chemical Spills Management
- Environmental Awareness.

In addition, local workplaces shall provide induction, instruction and/or training on any SOP applicable to a task or process in which a hazardous chemical is used.

GoldFFX users requiring training can use the eLearning modules provided as a feature within *GoldFFX*. Face to face training sessions on *GoldFFX* are delivered in a computer pool room - refer to the Safety & Wellbeing online booking calendar for the next scheduled course

(students must book by emailing the Safety & Wellbeing Team). Sessions can also be arranged for a group of local users by arrangement with the Safety & Wellbeing Team.

4.3 Purchase of hazardous chemicals

Prior to purchasing a hazardous chemical, consider the possibility of substituting a chemical with less risk (in accordance with the hierarchy of controls). The quantity purchased is to be kept to a minimum to reduce risks (e.g. of a chemical spill) and to avoid the costs associated with disposal of unused chemicals.

The **Purchasing and Safety** procedure is to be followed prior to any purchase, including completion of form **WHS12** for the relevant chemical process. On first purchase an SDS is to be obtained from the supplier.

Ensure that you follow local rules put in place by your Academic Unit and/or Central Unit or Research Institute in relation to purchase of hazardous chemicals including any requirements for prior authorisation.

Authorisation must be obtained from the Chemical and Nanomaterials Committee and SafeWork SA before purchase of a restricted or prohibited carcinogen (see section 4.15). It is strongly advised that the chemical processes in your project are approved by the Committee before purchase of any other hazardous chemicals which meet the Committee's criteria.

4.4 Safety Data Sheets (SDS)

Safety Data Sheets must be available for all hazardous chemicals being kept, handled or used. All university staff and students can access SDS online using *GoldFFX*. If a vendor and/or Gold SDS is not listed on the *GoldFFX* database an online form can be submitted to Chemwatch to request the required SDS from the vendor and/or prepare a Gold SDS[1]. The SDS will indicate whether the chemical is hazardous. Mini SDSs, a summarised version of a Gold SDS are available on *GoldFFX* in a variety of languages.

In view of the ready accessibility of vendor and Gold (M)SDSs on *GoldFFX* the filing of hard copy SDSs in folders or electronic copies in share drives is optional.

The manufacturer must update each of their SDS at least every five years. If the vendor SDS listed on *GoldFFX* is more than 5 years old, Chemwatch should be requested to obtain a more recent version. Chemwatch may also develop a Gold SDS.

To satisfy the WHS Regulations, contracts for the supply of hazardous chemicals to the University must include provision for the supplier to supply the appropriate SDS and notify the University of any changes in the formulation of the product. If the relevant vendor SDS is not listed on *GoldFFX,* the SDS from the supplier can be sent to Chemwatch with a request for them to add the SDS to their database with the permission of the vendor.

4.5 Hazardous Chemicals Register and Dangerous Goods Manifest

All university workplaces **must** enter all hazardous chemicals stored, used or produced in any process into *GoldFFX* in the Manifest folder for the relevant storage location. The **maximum** quantities kept or stored **must** be entered. For hazardous chemicals where there is no Chemwatch SDS, a Chemwatch SDS must be requested and/or the dangerous goods classification entered manually using the *GoldFFX* Data Extraction Tool based on information from the vendor SDS. Each workplace is to check its *GoldFFX* register/manifest at least annually to ensure all hazardous chemicals are entered and the information is correct.

For properly-labelled retail products (eg purchased from a supermarket or hardware store) in small quantities (say, less than 500 mL or 500 grams) and used for routine use in offices or staff kitchens for their normal purpose, it is optional to enter the chemical on *GoldFFX*.

[1]Click on **Settings** then select the **SDS Request** tab, or email *customerservice@chemwatch.net*.

Chemicals which are classified as 'Non-hazardous' are not required to be entered in your *GoldFFX* register. However, it may still be useful to record such chemicals for easy retrieval of the SDS or for general inventory purposes.

The **Report Generator** facility on *GoldFFX* can be used to produce an Excel spreadsheet of chemicals for sharing with staff and students who do not have a *GoldFFX* password to access the store/manifest. The report can include information such as the hazardous chemical classification, the dangerous goods classification and packaging group. This report serves as a hazardous chemicals register as required under the WHS Regulations. The list of chemicals in the *GoldFFX* manifest, or the report generated from it, also serves as a dangerous goods manifest, assisting compliance with the WHS Regulations, and ensures information is readily on hand for emergency services.

4.6 Risk assessment and control

For any process using hazardous chemicals, a risk assessment must be undertaken and recorded prior to the commencement of the chemical process. The relevant sections of **form WHS12 – Chemical Process Risk Assessment and Control** (see University Documents/ Forms) must be completed in consultation with relevant staff. External experts may be engaged depending on the complexity of the chemical and/or the process. Finalised risk assessments using **WHS12** must be reviewed at least every 3 years (see the *Managing Workplace Health and Safety Risks* procedure).

Administration to animals: Where hazardous chemicals are to be administered to animals, the risk assessment must take into account the metabolism and excretion of the chemical, any requirements for labelling or signage, any special precautions needed to control exposure arising from handling of the animal or from their environment, and the local SOP for safe disposal of animal waste and carcasses.

Chemicals in offices and staff kitchens: In the case of properly-labelled retail products (e.g. purchased from a supermarket or hardware store) in small quantities (say, less than 500 mL or 500 grams) and used for routine use in offices or staff kitchens for their normal purpose, the product may be used in accordance with the safety instructions on the label without a requirement to carry out a formal risk assessment using form **WHS12** or to enter the chemical on *GoldFFX*.

Researchers who maintain a workbook or similar, that is periodically reviewed by a supervisor, may do an initial assessment in the workbook based upon **section 12A** of form **WHS12**, which is to be attached in the workbook. The assessment must be available for inspection.

Generic risk assessments may be undertaken for processes which are performed on a regular basis using similar chemicals.

In situations where there is uncertainty about the degree of risk, there is a significant risk to health, or more complex chemical processes and/or exposures are involved, a more detailed risk assessment might involve obtaining additional information about health hazards, a thorough evaluation of the work to determine potential exposures (including workplace monitoring where appropriate), and the examination or testing of existing control measures. If atmospheric monitoring is required, it must be carried out by an appropriately qualified or competent person and the data must be recorded and kept for a period of not less than 30 years.

4.7 Carbon nanotubes and other engineered nanomaterials

Safe Work Australia has classified carbon nanotubes as hazardous chemicals. The use of carbon nanotubes is subject to the risk management provisions of the WHS Act, in particular Chapter 7 of the WHS Regulations covering hazardous chemicals. The University has a responsibility to protect the health and safety of its research staff and students but may also assume responsibilities as a manufacturer of substances, mixtures or products containing carbon nanotubes.

While the University awaits a better scientific understanding of the potential effects of engineered nanomaterials for health and safety, a precautionary approach is to be taken. By limiting exposure, especially through inhalation, any risks may be reasonably managed. The risk of exposure is greater if nanoparticles are produced in the form of fine powders, dusts or dusty materials. Current research indicates that in the majority of scenarios the same safety controls which are effective for hazardous chemicals are also effective for controlling exposure to nanomaterials, ie: enclosure, local exhaust ventilation, laboratory PPE (eg P2 face mask, Tyvek overalls, double gloving). Guidance is available in *Working Safely with Engineered Nanoparticles* on the Safety & Wellbeing website.

Any new research or teaching involving use or handling of engineered nanomaterials as a dry powder requires prior approval from the Chemical and Nanomaterials Committee (see section 4.8).

4.8 Research or teaching with hazardous chemicals and engineered nanomaterials

The use of certain highly hazardous chemicals or nanomaterials, including any highly toxic chemicals that require special precautions to be taken in their use or storage, requires approval from the Chemical and Nanomaterials Committee. Research projects or teaching courses involving hazardous chemicals that meet the following criteria require approval prior to commencement of work:

- Hazardous chemicals with a Chemwatch Hazard Rating of 4 for **toxicity**, **reactivity** or **chronic**
- Cytotoxic drugs
- Carcinogens (GHS Carcinogenicity categories 1A or 1B)
- Reprotoxins (GHS Reproductive toxicity categories 1A or 1B)
- Carbon nanotubes or other engineered nanomaterials used or handled as a dry powder.

Form **WHS15** Chemical Hazards Application must be submitted to the Chemical and Nanomaterials Committee with form **WHS12** attached.

4.9 Labels

The container of any hazardous chemical that is used, handled or stored at the workplace must be correctly labelled. Labelling is to be carried out in accordance with the Approved Code of Practice, *Labelling of Workplace Hazardous Chemicals* (Safe Work Australia) (see References).

While containers originating from a supplier or manufacturer will already be labelled, correct labelling is also required if the chemical is manufactured in the University; or decanted or transferred from the chemical's original container in the workplace. Labels are to be durable so as to remain legible and firmly attached to the container taking into account possible damage by moisture or chemicals.

Containers that are labelled for holding a hazardous chemical are only to be used for that purpose. Conversely, hazardous chemicals are only to be kept in containers which are intended for and labelled for that purpose, especially not in domestic drink or food containers.

Where hazardous substances are to be administered to animals, the animal cage or enclosure must be clearly labelled or sign-posted to alert researchers and animal facility staff to any special precautions that need to be taken when handling the animal, cleaning the cage or enclosure, or disposing of animal waste or carcasses.

When preparing your own labels, the Safety Data Sheet provides the information required for labelling such as the signal word (Danger or Warning), the hazard statement, the hazard pictogram and precautionary statements. *GoldFFX* provides a range of labels suitable for drums, winchesters and small bottles, including some label templates customised for UniSA.

The Code provides information on labelling of research chemicals or samples for analysis (section 3.2) where small container size may pose a challenge. Labels in this instance must, as a minimum, be written in English and include:

- the product identifier
- a hazard pictogram, and/or
- the hazard statement.

The product identifier may be the chemical name; abbreviation or acronym; or chemical formula, structure or reaction components.

Where labelling the actual laboratory container is impractical due to its size or the conditions under which it is used, other methods of providing the information can be used, for example a secure swing tag, a sign attached to supporting apparatus, or labelling on an outer container.

4.10 Storage

4.10.1 Regulatory and licensing requirements

Storage of hazardous chemicals in the workplace is covered by regulations 347, 348 and 361 in Chapter 7 of the WHS Regulations. These regulations set out requirements for manifests, notifications to SafeWork SA, and emergency plans.

The University must notify SafeWork SA if the amounts of chemicals used throughout the university exceed the 'manifest quantities' set out in Appendix D of the Code of Practice: *Managing Risks of Hazardous Chemicals in the Workplace*. At the date of this procedure the amounts of chemicals do not exceed the manifest quantities.

In addition, the University must maintain licences where applicable under the Dangerous Substances Act for the keeping of dangerous substances: LP gas (Class 2.1), flammable liquids (class 3), toxic substances (Class 6) and/or corrosive substances (Class 8). At the date of this procedure the University holds licences for Mawson Lakes and City East campuses.

4.10.2 General safe storage practices

The variety of containers or packages in which chemicals are kept may be stored in a range of configurations including:

- general laboratory/workshop shelves and cupboards
- chemical storage cabinets
- dedicated chemical stores
- storage areas for gas cylinders and cryogenic fluids
- bulk tanks or containers.

In designing storage arrangements workplaces shall refer to best practice for storage of chemicals as specified in Australian Standards including:

- AS 1940–2004 The storage and handling of flammable and combustible liquids
- AS/NZS 2243.10:2004 – Safety in laboratories – Part 10: Storage of chemicals
- AS 3780–2008 The storage and handling of corrosive substances
- AS/NZS 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers
- AS 4332–2004 The storage and handling of gases in cylinders.

4.10.3 Storage and risk assessments

The availability of suitable safe storage arrangements is to be considered when conducting risk assessments using **WHS12** and in developing the SOP for the chemical process. In areas where there is high chemical usage, a workplace SOP shall be introduced explaining local arrangements and safe working rules for chemical storage.

4.10.4 Incompatibility and segregation of chemicals

In planning storage, it is imperative to consider storage compatibility for hazardous 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 on conditions for safe storage and compatibility is the SDS for the relevant chemicals (see section 7 of the SDS). Tables or charts are published[2] as a general guide on compatibility based on classification but with accompanying notes listing a number of exceptions or examples of particular incompatibilities.

Authorised password holders can use *GoldFFX* to produce an **Incompatibility Report** for a store manifest. Select the relevant folder (eg the flammables cabinet in your laboratory), click on the **Hazards Filter**, then select the **Incompatibility** report from the pull-down menu. A list will appear showing required segregation. Supplementary guidance notes are also given for the particular dangerous goods class combinations. This report is a guide and is not meant to replace an SDS or risk assessment.

4.10.5 Placarding

The workplace must ensure that a placard is prominently displayed if the 'Placard quantity' is exceeded as presented in Appendix D of *Managing the Risks of Hazardous Chemicals in the Workplace*. The need for placarding is easily checked by using *GoldFFX*. Simply click on the part of the store tree you want to check (e.g. all Future Industries Institute laboratories and stores located in Building IW), and the required placards are displayed above the chemicals manifest.

4.10.6 Storage in laboratory cupboards and chemical cabinets

Local safe working rules and SOPs are to reflect the following principles (in addition to requirements prescribed elsewhere in this procedure):

- The quantities of hazardous chemicals shall be kept to a minimum according to usage and shelf-life.
- The type and size of individual packages shall be chosen to minimize the quantities and handling risk. Breakable or non-spill proof packages should be avoided. 'User-friendly' small packages may be filled from larger containers kept elsewhere.
- Chemicals stored are to be reviewed at least annually to dispose of chemicals which are no longer required.
- Containers that have held hazardous chemicals shall be treated as full, unless the receptacle or package has been fully cleaned of chemical residues.
- Food or drink containers shall not be used as storage containers for chemicals.
- Fume cupboards are not to be used for chemicals storage. If ventilation is required a ventilated chemicals cabinet shall be used or similar arrangement based on risk assessment.
- Chemicals or their plastic containers shall not be stored in direct sunlight.
- Domestic refrigerators or freezers shall not be used for storing flammable or explosive chemicals.
- 'Intrinsically safe'[3] 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.
- 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.
- Each chemical storage cabinet, even in cases of shared use, must have a designated person responsible for its management.
- The sump of a chemicals cabinet shall not be used for storage.

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[2] ADG Code, Table 9.1, p1085 (Edition 7.4)
Workplace Health and Safety Queensland, Segregation Tool for Dangerous Goods
Chemwatch, A Guide to Classification brochure - hard copies available from Safety & Wellbeing Team.

[3] Intrinsically safe equipment — equipment within which the energy of any spark or discharge is limited to energies below that necessary to ignite a specified flammable gas or vapour.

- Chemical wastes shall be clearly identified as waste and stored in areas designated for wastes.
- Chemical containers shall not be kept on floors or similar so as to obstruct walkways or access to emergency facilities such as emergency showers, eye washers or emergency exits.

4.10.7 Management of 'time-sensitive' chemicals

Local storage arrangements need to give special attention to 'time-sensitive' chemicals. Time-sensitive chemicals are those chemicals that when stored for prolonged periods can develop hazards which were not present in the original formulation. Extra hazards can arise if the storage conditions are not appropriate or the chemicals are stored for too long. For example, a multi-nitro chemical such as picric acid might be shipped with a stabiliser such as water, but if the water dries out over time the chemical may become shock sensitive. The University has previously discovered picric acid in this dangerous state and explosives experts were engaged to dispose of the chemical. In addition to multi-nitro chemicals, time-sensitive chemicals include peroxide forming chemicals[4], chloroform, anhydrous hydrogen fluoride and hydrogen bromide, liquid hydrogen cyanide, formic acid and alkali metals.

Local procedures should include identification of such chemicals at purchase with implementation of a suitable storage arrangement for that chemical and monitoring of over time of the condition of the chemical. Time-sensitive chemicals have a limited shelf life and should be disposed of if no longer in use or if they have been kept in storage for a long time since purchase. Considerations in the safe management of time-sensitive chemicals are described in a special series in the Journal of Chemical Health & Safety (see References).

4.11 Chemical spill management

4.11.1 Spill risk assessment and control

Each university workplace storing, using or handling hazardous chemicals shall undertake a systematic workplace-wide risk assessment to anticipate any foreseeable risks of chemical spills and introduce local contingency plans, SOPs and work practices suitable for the chemical quantities, classifications and processes involved. The following must be taken into account:

- the types of chemical hazards associated with the work undertaken
- the specifics of the work environment, work practices and facilities
- the local level of knowledge and training in chemical safety and spills response.

Where, based on the assessment above, there is a significant risk of a major spill, the workplace shall note Chemical Spills as a category of hazard on the workplace Hazard Register (**WHS1**), with risk controls monitored and reviewed on a regular basis.

Workplaces shall consult with staff, research students, designated First Aid Officers, emergency evacuation staff and elected health and safety representatives (where applicable) when making decisions about the chemical spills management provisions required for their workplace.

Workplaces are to ensure that chemical process risk assessments (form **WHS12**) consider chemical spill risks, including whether standard chemical spill provisions are adequate, and that SOPs for chemical processes incorporate chemical spill measures. The adequacy of chemical spill arrangements is to be monitored during workplace inspections (e.g. using form **WHS17**).

[4] See Queensland Government Safety Alert.

4.11.2 Spill preparedness

Workplaces shall prepare for chemical spills by taking the following actions:

(a) Facilities and personnel

- establish a local workplace system to ensure that suitable spill kits are readily accessible along with regular checking and restocking of each spill kit.
- supply and maintain suitable PPE to cater for foreseeable spills
- provide and maintain suitable eye washers and emergency showers
- provide safe facilities e.g. laboratory bench surfaces, drainage systems and ventilation systems
- ensure chemicals are stored appropriately including provision of well-sealed containers, drip trays, cabinets with inbuilt spill retention, and stores with bunding
- ensure a First Aid Officer is available, and first aid kit, with access to any special first aid provisions necessary (e.g. calcium gluconate for HF acid)
- ensure suitable fume cupboards and ventilation system controls are installed to minimise the likelihood and impact of spills
- supply and maintain SCBA if risk assessed as needed for foreseeable spills.

(b) Contingency planning

- integrate steps for responding to foreseeable chemical spills into workplace contingency and emergency plans
- prominently display response steps and contact numbers in work locations where spills are foreseeable
- test chemical spill response preparedness at regular intervals
- explain in local response steps how to turn off equipment and energy sources (eg air conditioning/ventilation; gas, electricity).

(c) Induction, instruction, training and information

- inform new and transferring staff of local chemical spill management arrangements at the same time as they are inducted on emergency and first aid arrangements using form **WHS23** - this includes the location of spill kits and emergency eye washers/showers
- ensure staff or research students complete the online training module on Chemical Spills Management if identified in local workplace safety training needs assessments based on the risk of foreseeable spills
- instruct staff, research students, First Aid Officers and EEOs (Emergency Evacuation Officers) on local contingency plans for chemical spills
- train staff and research students how to respond to and clean up minor spills
- inform staff and research students on how to respond to major spills
- provide members of any chemical assistance team with additional training if needed to achieve the required level of competency to advise on major spills
- provide any staff designated with the role of using SCBA with instruction and training and keep records of this training.

4.11.3 Containing spills and transferring hazardous chemicals

Where there is a risk of a spill or leak of a hazardous chemical in a solid or liquid form, then the Regulations (Reg 357) require that a spill containment system is in place that will contain within the workplace any spill or leak and any resulting effluent. Factors to consider when designing a spill containment system are listed on page 37 of the Code of Practice: *Managing the Risks of Hazardous Chemicals in the Workplace*.

Transferring hazardous chemicals generally presents a far greater risk than for static storage. Page 37 of the Code also lists common methods for eliminating or reducing risks during transfer operations.

The spill containment system must prevent certain types of chemicals from entering the storm water system.

4.12 Disposal

Information contained within SDSs are to be referred to and considered when determining the most appropriate means of disposal. All substances no longer required are to be removed from the workplace by a licensed operator for disposal, as per Environment Protection Authority (EPA) guidelines. Workplaces are to provide the necessary facilities and SOPs to achieve safe disposal.

4.13 Transport

Dangerous goods that are to be transported must comply with containment and packaging guidelines laid down in the ADG Code and, where applicable, IATA Regulations. The ADG Code only applies if dangerous goods are moved outside of university premises. Winchesters must be transported around the university in a carrier or foam box in accordance with local SOPs.

4.14 Health monitoring

A university workplace must provide health monitoring if a worker is carrying out **ongoing work** with a hazardous chemical and there is **a significant risk to health** because of exposure to the hazardous chemical.

For further guidance refer to Section 5.1 Health Monitoring in the Approved Code of Practice *Managing the Risks of Hazardous Chemicals in the Workplace*. Appendix E of the Code lists 15 hazardous chemicals with specific health monitoring requirements – see the table below.

In practice, health monitoring is rarely if ever required in our university work environment. The emphasis is always to be placed on safe design of chemical processes (eg experimental protocols) and effectiveness of control measures so that exposures and associated risk will be too low to require health monitoring. However, in some instances there may be elevated concern about potential ongoing exposures to a hazardous chemical. In this case advice should be sought from the University Chemical Officer, campus WHS Consultant, technical services staff, or other members of the Safety & Wellbeing Team.

Table: Hazardous chemicals with specific health monitoring requirements under regulations

• **Acrylonitrile** • **Arsenic (inorganic)** • **Benzene** • **Cadmium** • **Chromium (inorganic)** • **Creosote** • **Crystalline silica** • **Isocyanates**	• Mercury (inorganic) • 4,4`-Methylene bis (2 choroaniline) (MOCA) • Organophosphate pesticides • Pentachlorophenol (PCP) • Polycyclic aromatic hydrocarbons (PAH) • Thallium • Vinyl chloride

4.15 Prohibited and restricted carcinogens

Workplaces may not store, handle or use certain prohibited or restricted carcinogens or restricted hazardous chemicals unless the University has obtained prior authorisation from SafeWork SA for their use in 'genuine research or analysis'. Internal university approval must first be sought from the Chemical & Nanomaterials Committee (see section 4.8). A full list of the prohibited/restricted carcinogens/chemicals is presented in Appendix C of the Code of Practice: *Managing Risks of Hazardous Chemicals in the Workplace*.

Where such carcinogens are authorised for **storage only** the container is to be durably labelled: 'Prohibited (Restricted) Carcinogen - Do Not Use - SafeWork SA authorisation required.'

Contact the Safety & Wellbeing Team to check if any SafeWork SA authorisations have been granted to UniSA for a listed carcinogen or hazardous chemical. At the date of this procedure the only authorisation possessed by UniSA is for the storage only of benzene in the Pharmacy & Bio-Medical Sciences Program.

4.16 Controlled substances and 'Regulation 25' Poisons

Some hazardous chemicals are classified as poisons under the Controlled Substances Act, 1984. Compliance with this legislation is administered by SA Health.

The University holds an annual Controlled Substances Permit for use of Schedule 2, 3, 4 and 7 poisons at each campus except Mount Gambier. This general permit is for the purposes of research, instruction, training or analysis only. Each permit applies standard conditions which need to be met in addition to any requirements under WHS regulations. The poisons must:

- not be re-sold or supplied to any other person
- be **stored** in suitable containers, appropriately labelled, and when, not in use, stored in a locked receptacle or enclosure
- not be kept elsewhere than at the specified premises except where allowed by university or local procedures.
- be subject to **restricted access** to only authorised persons or in accordance with procedures
- have **records** maintained indicating the quantity of each poison received, used or destroyed
- have any **theft or loss reported** – see section 4.17.3 below.

A small number of poisons must be specifically listed on the campus Permit if they are being kept or used by the University. There are 15 poisons listed under regulation 25 of the Controlled Substances (Poisons) Regulations 2011:

1) Arsenic as an S7 poison
2) Cyanides as S7 poisons
3) DDT
4) Thallium
5) Sodium fluoroacetate
6) Fluoroacetic acid
7) 4-aminopropiophenone
8) Acrolein
9) Chloropicrin
10) Cyanogen
11) Fluoroacetamide
12) Hydrocyanic acid as S7 poison
13) Methyl bromide
14) Mirex
15) Strychnine as S7 poison.

At the date of this procedure the University has permission to keep or use poisons (1) to (6) above at Mawson Lakes campus only. If you need to keep or use any of these poisons beyond our current permission please notify the Safety & Wellbeing Team so that the campus permit may be amended.

4.17 Security of chemicals and controlled substances

4.17.1 Chemicals of security concern

Some readily available chemicals, including those used in universities, can be used by terrorists to make homemade explosives or toxic devices. These chemicals and other toxic chemicals that could be misused by terrorists are known as 'chemicals of security concern'. A voluntary National Code of Practice for Chemicals of Security Concern (see References) applies to 15 chemicals of security concern that have the potential to be used to develop homemade explosives or toxic devices (see Appendix). Ammonium nitrate is not included in the Code's group of 15 high-risk chemicals as it is already regulated by laws in each state and territory.

All university workplaces are to review their security risks and ensure that controls are in place based on the level of risk. Facilities Management Unit can provide advice on suitable control measures.

Report any suspicious activity to **Security** on **88888**. Security will communicate with the Australian Government National Security Hotline.

4.17.2 Security sensitive ammonium nitrate

Specific regulatory requirements apply to the tertiary research and teaching sector in South Australia in relation to security sensitive ammonium nitrate (SSAN). In accordance with these requirements all university workplaces purchasing, storing, using or disposing of SSAN are to take the following actions:

- record each purchase, use or disposal of SSAN in an auditable format listing quantity and date.
- keep each record for a period of at least 5 years
- make the records available to a SafeWork SA inspector on request within 14 days
- **report immediately any loss or theft of SSAN** to **Security** on **88888**, who will notify SafeWork SA and South Australia Police (SAPOL)
- implement local protocols to ensure that quantities of SSAN are kept in a secure manner and are only used for specified research or educational purposes.
- keep **no more than 3 kg** of SSAN in any laboratory or other area of use at any time.

The use or storage of SSAN is to be recorded on *GoldFFX*.

4.17.3 Theft or loss of drugs or other controlled substances

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 relevant permit conditions and the SA Health policy 'Suspected Theft or Loss of Drugs or Substances from Licence or Permit Holders' (see References).

Reportable incidents arise where there are reasonable grounds to suspect:

1. **Theft**: a theft or loss of a drug, prohibited substance or Schedule 7 poison
2. **Unaccounted loss**: a quantity of drugs or prohibited substances that cannot be reasonably accounted for, or
3. **Suspicious behaviour**: A staff member and/or contractor who has access to such drugs or prohibited substances exhibits such behavior that you or others reasonably suspect that the person may be abusing or diverting drugs or substances.

In the case of any reportable theft, loss or suspicious behaviour:

- notify **Security** on **88888**
- report to relevant authorities in accordance with the SA Health policy (see References).

5. Performance Measures

- Risk assessments are properly completed for all chemical processes involving use of hazardous chemicals.
- All hazardous chemicals are properly entered onto the relevant *GoldFFX* manifest.
- All hazardous chemicals are correctly labelled.
- All chemical users have completed the applicable online training modules for hazardous chemicals and chemical spill management.
- All university workplaces have provided suitable spill kits based on foreseeable chemical spills
- All university workplaces have assessed security risks for chemicals of security concern and controlled substances and introduced suitable controls
- All university chemical cabinets and chemical stores have correctly segregated chemicals.

6. University Documents/Forms

For further advice on managing risks in university workplaces, including procedures, guidance, forms and training courses, please visit the Safety & Wellbeing website.

Safety & Wellbeing website

- Managing Workplace Health and Safety Risks
- Purchasing and Safety
- Safe Operating Procedure development
- Guide for Safe Use of Liquid Nitrogen
- Guide for Working Safely with Engineered Nanoparticles
- WHS12 – Chemical Process Risk Assessment and Control
- WHS15 – Chemical Hazards Application
- WHS17 – Workplace Inspection Checklist Laboratory Environment
- WHS23 – Induction Checklist
- WHS60 – Chemical Spill Guides
- WHS8 – Safe Operating Procedure Development.

Facilities Management Unit, Emergency Procedures booklet
Refer to Appendix B of this procedure for the emergency response sheet on Hazardous Materials: Gas Leak or Chemical Spill.

Online Hazard/Incident Reporting & Investigation System

References

SafeWork SA Legislation—WHS legislation and Approved Codes of Practice:

- Work Health and Safety Act 2012
- Work Health and Safety Regulations 2012
- How to Manage Work Health and Safety Risks
- Managing Risks of Hazardous Chemicals in the Workplace
- Labelling of Workplace Hazardous Chemicals
- Preparation of Safety Data Sheets for Hazardous Chemicals
- First Aid in the Workplace.

Government of South Australia, Dangerous Substances Act 1979
National Transport Commission, Australian Code for the Transport of Dangerous Goods by Road or Rail ('ADG Code')
Workplace Health and Safety Queensland Segregation Tool for Dangerous Goods
Safe Work Australia, Hazardous Chemicals overview webpage
Safe Work Australia, Nanotechnology research
Australian Government, National Code of Practice for Chemicals of Security Concern
Environment Protection Authority (EPA)
Journal of Chemical Health & Safety. Series on management of time-sensitive chemicals: I, II , III.

SA Health:

- Controlled Substances legislation
- Webpage - Theft and loss of medications from health facilities and licence or permit holders
- Policy and Incident Report Form - Suspected Theft or Loss of Drugs from Licence or Permit Holders (PDF 209KB).

Australian Standards online (UniSA subscription)

- AS 1940–2004 The storage and handling of flammable and combustible liquids
- AS/NZS 2243.1:2005 – Safety in laboratories – Part 1: Planning and operational aspects
- AS/NZS 2243.2:2006 – Safety in laboratories – Part 2: Chemical aspects
- AS/NZS 2243.3:2010 – Safety in laboratories – Part 3: Microbiological safety and containment
- AS/NZS 2243.10:2004 – Safety in laboratories – Part 10: Storage of chemicals
- AS 2030: Gas cylinders (Approved Code of Practice)
- AS/NZS 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers
- AS 3780–2008 The storage and handling of corrosive substances
- AS 4332–2004 The storage and handling of gases in cylinders
- AS 4775–2007 Emergency eyewash and shower equipment.

(Note: This may not be a complete list of applicable Australian Standards)

Appendix A - Security sensitive chemicals

The National Code of Practice for Chemicals of Security Concern applies to any quantity of the 15 chemical precursors to homemade explosives or toxic devices, including chemical substances or mixture of substances, at concentrations set out in the table below. Businesses are also encouraged to consider applying the code where appropriate if they handle, manage or store any of the full list of 96 chemicals of security concern shown in Appendix A of the national code.

Security sensitive ammonium nitrate (SSAN) has been added to the table because of the specific regulatory obligations which apply.

Chemical	Concentration
Precursors to homemade explosives	
Ammonium nitrate	(a) ammonium nitrate; or (b) ammonium nitrate mixture at greater than 45% mass per mass mixed with any other substance. Solutions of ammonium nitrate are excluded.
Ammonium perchlorate	(a) in a water-based solution containing 10% or higher of ammonium perchlorate; or (b) in a form other than a water based solution, at a concentration of ≥ 65%.
Hydrogen peroxide	(a) in a water-based solution at any concentration; or (b) in a form other than a water-based solution, at a concentration of ≥ 15%.
Nitric acid	at a concentration of 30% or higher
Nitromethane	at a concentration of 10% or higher
Potassium chlorate	(a) in a water-based solution containing 10% or higher of potassium chlorate; or (b) in a form other than a water-based solution, at a concentration of ≥ 65%.
Potassium nitrate	(a) in a water-based solution containing 10% or higher of potassium nitrate; or (b) in a form other than a water-based solution, at a concentration of ≥ 65%..
Potassium perchlorate	(a) in a water-based solution containing 10% or higher potassium perchlorate; or (b) in a form other than a water-based solution, at a concentration of ≥ 65%.
Sodium azide	at a concentration of 95% or higher.
Sodium chlorate	(a) in a water-based solution containing 10% or higher sodium chlorate; or (b) in a form other than a water-based solution, at a concentration of ≥ 65%.
Sodium perchlorate	(a) in a water-based solution containing 10% or higher sodium perchlorate; or (b) in a form other than a water-based solution, at a concentration of ≥ 65%.
Sodium nitrate	(a) in a water-based solution containing 10% or higher sodium nitrate; or (b) in a form other than a water-based solution, at a concentration of ≥ 65%.
Chemicals used in making a toxic device	
Aluminium phosphide	At any concentration.
Chlorine (gas only)	At any concentration.
Potassium cyanide	At any concentration.
Sodium cyanide	At any concentration.

Appendix B - Hazardous Materials Emergency Procedure: Gas Leak or Chemical Spill

Excerpt from the UniSA Emergency Procedure Booklet 2018: Hazardous Materials, Page 8. To check for the most recent version visit the Facilities Management Unit website.

GAS LEAK OR CHEMICAL SPILL

Call 88888 or 1800 500 911 IMMEDIATELY

If it is a **gas leak or chemical spill, DO NOT** activate building alarms, **DO NOT** use mobile phones, hand-held radios, electronic equipment or light flammable material.

If a gas leak or chemical spill is affecting people in your area, immediately:

1. **REMOVE**
    - Anyone in immediate danger only if it is safe to do so
    - DO NOT allow other people in the area
    - If anyone is exposed to the substance, set up an isolation area.
    - If available and only if it is safe to do so, put on personal protective equipment, observe and support the person until Emergency Services arrive.
    - DO NOT put yourself at risk.
2. **ISOLATE** the hazardous material by clearing the area, close the doors. If safe to do so turn off isolation switches, ventilation and machinery. DO NOT touch suspect material.
3. **NOTIFY**
    - If it is a **'gas'** or **'chemical'**, shout a warning, pass the alarm by word of mouth.
    - If able to ring from a safe area away from the leak or spill, **DIAL 88888** or **1800 500 911** from a landline, state **'HAZARDOUS MATERIAL'**, and give **exact location** and **type of material involved**.
4. **CONTAIN**
    - Do not risk contact with material or allow it to spread.
    - Do not smell, touch or taste it.
    - Close doors between you and the hazardous material.