

# SAFE USE AND STORAGE

## OF CHEMICALS (INCLUDING PESTICIDES AND HERBICIDES) IN AGRICULTURE

CODE OF PRACTICE 2006

**Disclaimer**

This publication may contain occupational health and safety and workers compensation information. It may include some of your obligations under the various legislations that WorkCover NSW administers. To ensure you comply with your legal obligations you must refer to the appropriate legislation.

Information on the latest laws can be checked by visiting the NSW legislation website ([www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au)) or by contacting the free hotline service on 02 9321 3333.

This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.

# **CODE OF PRACTICE FOR THE SAFE USE AND STORAGE OF CHEMICALS (INCLUDING PESTICIDES AND HERBICIDES) IN AGRICULTURE**

Revised 2nd edition 2006

Code of practice for the safe use and storage of chemicals (including pesticides and herbicides)  
in agriculture

Revised edition 2004

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## FOREWORD

This is the second edition of this Code of practice, which has been amended to take into account legislative changes including changes to provisions applying to dangerous goods.

WorkCover NSW prepared this Code of practice to provide a practical and informative guide to persons working in agricultural industries on how to conform with the relevant legislation relating to the use and storage of chemicals. This includes pesticides and herbicides.

This Code of practice will promote safe and healthy practices in the use, storage and transport of agricultural chemicals by end users. It will assist users to minimise detrimental effects to human health and the environment by suggesting ways to control the risks of exposure to those substances classified as hazardous substances. This Code of practice covers chemicals commonly used in agriculture including substances such as pesticides, fertilisers, fuels, disinfectants, and emissions such as dusts or fumes. It includes advice on the storage and handling of those substances classified as dangerous goods.

Persons who will find this Code of practice useful include farmers, pastoralists, horticulturists, orchardists, and foresters.

This Code of practice will assist users to comply with the *Occupational Health and Safety Regulation 2001*. This Code of practice has also been written to ensure consistency with the *Pesticides Act 1999* and environmental legislation where relevant.

Trainers, educators, medical practitioners and government officers may also find this Code provides useful background material which will assist in providing advice to their clients.

Note: Illustrations used in this Code of Practice are illustrative only and are not intended to demonstrate exact requirements or procedures.

## What is an approved industry code of practice?

An approved industry code of practice is a practical guide to employers and others who have duties under the *Occupational Health and Safety Act 2000* (the OHS Act) and the *Occupational Health and Safety Regulation* (OHS Regulation) with respect to occupational health, safety and welfare.

An industry code of practice is approved by the Minister administering the OHS Act. It comes into force on the day specified in the code or, if no day is specified, on the day it is published in the *NSW Government Gazette*. An approved industry code of practice may be amended from time to time (or it may be revoked) by publication in the Gazette.

An approved industry code of practice should be observed unless an alternative course of action that achieves the same or a better level of health, safety and welfare at work is being followed.

An approved industry code of practice is intended to be used in conjunction with the requirements of the OHS Act and the OHS Regulation but does not have the same legal force. An approved industry code of practice is advisory rather than mandatory. However, in legal proceedings under the OHS Act or OHS Regulation, failure to observe a relevant approved industry code of practice is admissible in evidence concerning an offence under the OHS Act or OHS Regulation.

A WorkCover Authority inspector can draw attention to an approved industry code of practice in an improvement or prohibition notice as a way of indicating the measures that could be taken to remedy an alleged contravention or non-compliance with the OHS Act or OHS regulation. Failure to comply with an improvement or prohibition notice without reasonable excuse is an offence.

*In summary an approved industry*

### **CODE OF PRACTICE**

- Gives practical guidance on how health, safety and welfare at work can be achieved.
- Should be observed unless an alternative course of action that achieves the same or a better level of health, safety and welfare in the workplace is being followed.
- Can be referred to in support of the preventive enforcement provisions of the OHS Act or OHS Regulation.
- Can be used as evidence to support a prosecution for failing to comply with or contravening the OHS Act or OHS Regulation.

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# CHAPTER 1 – INTRODUCTION

## 1.1 Title

This is the *Code of practice for the safe use and storage of chemicals (including pesticides and herbicides) in agriculture*.

## 1.2 Purpose

This Code of practice provides practical guidance on the safe use and storage of all types of chemicals, including pesticides, herbicides and other agricultural chemicals, to protect the health and safety of workers. This will assist users achieve a safe system of work, and comply with the *Occupational Health and Safety Act 2000* and the *Occupational Health and Safety Regulation 2001*.

In meeting OHS obligations, this code has attempted to ensure that there is no conflict with other obligations such as environmental legislation.

## 1.3 Scope

### 1.3.1 Matters included

This Code of practice applies to employers, self-employed persons and employees engaged in the use, storage and disposal of chemicals (including pesticides and herbicides) in agricultural workplaces.

Examples of chemicals used in agriculture covered by this code include ammonia, LP Gas, detergents, cleaning agents, degreasers, solvents, fuels, dyes, fertilisers and antiseptics, as well as registered agricultural chemicals such as pesticides.

### 1.3.2 Exclusions

This Code of practice does *not* apply to the following:

- i. The manufacture, warehousing, distribution or sale of chemicals.
- ii. Workplaces processing or storing agricultural products when not part of an agricultural premises (property). Such industries (eg wineries, oil extraction) should consult other relevant codes of practice relating to hazardous substances and dangerous goods.
- iii. Use of timber preservatives and treated timber where covered in the *National Code of Practice and Guidance Note for the Safe Handling of Timber Preservatives and Treated Timber* (an approved Code of Practice under Section 43 of the *NSW Occupational Health and Safety Act 2000*).
- iv. Storage or use of explosives.
- v. The use of pesticides and herbicides in non-agricultural workplaces, which are covered by the *Code of practice for the safe use of pesticides including herbicides in non-agricultural workplaces*. Examples of non-agricultural work with pesticides include urban pest control, green keeping, local government park maintenance, and the protection of food processing and bulk grain storage silos when not on a farm.

## 1.4 Commencement

This amended code of practice commenced on the day of publication in the *Gazette*. It amends the *Code of practice for the safe use and storage of chemicals (including pesticides and herbicides) in agriculture* that commenced on 1 September 1998.

## 1.5 Authority

This is an approved industry code of practice, approved by the Minister for Commerce in accordance with the provisions of Section 43 of the *Occupational Health and Safety Act 2000* (OHS Act), and amended as provided by Section 45 of the OHS Act.

## 1.6 Definitions

Most of the following definitions are those used in the OHS Act and OHS Regulation. However, some have been specifically developed for the purposes of this code of practice.

**ADG Code** means the *Australian Code for the Transport of Dangerous Goods by Road and Rail* approved by the Ministerial Council for Road Transport and published by the Australian Government from time to time.

Note: This code has the force of law and is adopted into regulations in NSW. It is produced by the Federal Office of Road Safety of the Commonwealth Department of Transport and Communications.

**agricultural workplace** means a workplace predominantly engaged in the production of stock and/or crops and/or animal or crop products (such as oils, wine, milk or wool), including farms, pastoral leases, orchards, vineyards, market gardens and forestry. This does not include workplaces solely processing or storing agricultural products.

**anti-cholinesterase** describes a health effect of certain compounds such as organophosphate pesticides. These health effects are described in section 6.5

Note: Health surveillance may be required for organophosphate pesticides, see section 6.4.

**application** means any method of application of a pesticide by any means including spraying, puddling, gaseous fumigation and the use of baits, foams, gels, granules, powders or fogs, for the purposes of this Code of practice.

**authorised medical practitioner** means a medical practitioner authorised by WorkCover, or authorised by another body or under a scheme approved by WorkCover to perform health surveillance for the purposes of the OHS Regulation.

**bulk** means solids in an undivided quantity of more than 400 kg, or a container for liquids or solids of capacity of more than 450 Litres, or a container for gas with a (water) capacity of more than 500 L, and includes a bulk container, such as an intermediate bulk container (IBC).

**bund** means an embankment or wall, which may form part or all of the perimeter of a compound, designed to contain spills of liquid.

Note: Both the bund and the compound floor must be sufficiently impervious to retain spillage or leakage.

**chemical** means any chemical or gas, and includes any of the following products:

- a pesticide (including a herbicide or fumigant),
- a hazardous substance,

- a dangerous goods, or
- a poison.

Note: This definition was developed for this specific Code of practice.

**Class** means the Class allocated to dangerous goods under the ADG code.

**confined space** means a space which may become contaminated or oxygen deficient.

Notes: This is fully defined in clause 66 of the *Occupational Health and Safety Regulation 2001*. This is not normally a workplace and includes locations such as pits and tunnels and may include farm silos.

**consumer package** means a container that is intended for retail display and sale, and includes a container that is transported and distributed as part of a larger consolidated container that consists of a number of identical consumer packages.

**container** means anything in or by which a substance or item is wholly or partly cased, covered, enclosed, or packed, whether it is empty, or partially or completely full.

**dangerous goods** has the same meaning as in the ADG Code.

Notes: The dangerous goods classification includes physical hazards such as flammability, but also includes some health hazards. Some dangerous goods are also hazardous substances. Diesel fuel is a combustible liquid C1, and is defined as a dangerous goods for the purposes of chapter 6A of the OHS Regulation. The supplier has the obligation to identify dangerous goods and provide material safety data sheets.

**employee** means an individual who works under a contract of employment or apprenticeship.

**employer** means a person who employs persons under a contract of employment or apprenticeship.

Note: A person includes a corporation or an individual person.

**exposure standard** means the standard determined in accordance with the documents entitled *Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 3008] and *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 1003], as amended from time to time by amendments published in the Chemical Gazette of the Commonwealth of Australia.

Note: this refers to the airborne concentration of a particular substance in a person's breathing zone and does not include an evaluation of skin contact.

**fumigant** means any of the following chemicals:

- (b) methyl bromide,
- (c) phosphine,
- (d) ethylene oxide (except single dose canisters),
- (e) ethylene dichloride,
- (f) carbon disulphide,
- (g) chloropicrin,
- (h) hydrogen cyanide.

Note: A certificate of competency is required for the use of the above fumigants.

**fumigation** means the process of applying a pesticide in the gaseous phase, including the use of liquids that evaporate, or solids that sublime, burn or react, to produce a gas.

**hazard** means anything (including work practices and procedures) that has the potential to harm the health and safety of a person.

Note: The hazard of a pesticide is the potential for a pesticide to cause an adverse effect, due to its intrinsic properties. This can be a health hazard or a physical hazard or both. The possibility of this is risk (see the definition of risk).

**hazardous substance** means a substance that:

- (a) is listed in the National Occupational Health and Safety Commission's publication, *List of Designated Hazardous Substances*, as in force from time to time, or
- (b) fits the criteria set out in the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances*, as in force from time to time.

Notes: A hazardous substance has an adverse health effect, as distinct from the physical hazards shown by some dangerous goods. The above information is available online by searching the Hazardous Substances Information System (HSIS) on the web site [www.ascc.gov.au](http://www.ascc.gov.au).

**health surveillance** means the monitoring of persons to identify changes (if any) in their health due to exposure to a hazardous substance, and includes biological monitoring, but does not include atmospheric monitoring.

**herbicide** is included in the legal definition of pesticide.

**ignition source** means any source of energy sufficient to ignite combustible dusts, combustible fibres, flammable vapours, flammable gases, or flammable or combustible fumes and includes the following:

- a naked flame,
- exposed incandescent material,
- hot surfaces,
- radiant heat,
- a spark from mechanical friction,
- a spark from static electricity,
- an electrical arc,
- any electrical, electronic, mechanical or other equipment.

**MSDS** means a material safety data sheet prepared in accordance with the OHS Regulation.

Note: A MSDS provides comprehensive health and safety information.

**must** means a legal obligation imposed by an Act or Regulation.

**OHS Act** means the *Occupational Health and Safety Act 2000*.

**OHS Regulation** means the *Occupational Health and Safety Regulation 2001*.

Note: This is reviewed and remade every 5 years and so the date may change.

**organophosphate** pesticide is an organic compound which contains phosphorous.

Note: This usually has the words "anti-cholinesterase compound" or "cholinesterase inhibitor" on the label. Organophosphate pesticides exert their health effect by inhibiting enzymes in the nervous system. Health checks may be required (see sections 6.4 and 6.5).

**package** means the completed product of the packing of a substance (including a pesticide) and consists of the substance and its packaging but does not include a bulk container.

**Packing Group (PG)** means the division of certain classes of *dangerous goods* into three hazard groups, indicated by the Roman numerals I (great danger), II (medium danger), or III (minor danger).

**pest** means: (a) in relation to an animal, plant or thing – any animal, plant or other biological entity that injuriously affects the physical condition, worth or utility of the first-mentioned animal or plant or of that thing; or (b) in relation to a place – an animal, plant or other biological entity that injuriously affects the use or enjoyment of that place.

**pesticide** means a substance as defined by the *Pesticides Act 1999*, used for controlling pests.

Note 1 – this includes herbicides, bactericides, baits, fungicides, insecticides, rodenticides, repellents and chemicals used for the control of animal ectoparasites.

Note 2 – a pesticide may also be a hazardous substance, a dangerous goods, a scheduled poison, and/or a fumigant.

Note 3 – the Pesticides Act adopts the AgVet Code definition.

**place of work** means premises where persons work.

**poison** means any substance contained in a schedule of the *Standard for Uniform Scheduling of Drugs and Poisons (SUSDP)*, published by the Commonwealth Government Printer.

**premises** includes any place, and in particular includes:

- (a) any land, building or part of any building, or
- (b) any vehicle, vessel or aircraft, or
- (c) any installation on land, on the bed of any waters or floating on any waters, or
- (d) any tent or moveable structure.

**record** includes any form in which information is stored on a permanent basis or from which information may be reproduced.

**retailer** means a person who sells goods to any member of the public who themselves are not engaged in any further resale of the goods.

Notes: Examples of retailers are supermarkets or hardware stores. A reseller or trade outlet is not a retailer.

**risk** is a combination of the likelihood of an adverse effect occurring and its severity.

**self-employed person** means a person who works for gain or reward other than under a contract of employment or apprenticeship, whether or not he or she employs others.

Note: Some of the legal obligations in the OHS Regulation applying to “employers” also apply to self-employed persons in relation to their duties to others in the workplace (see the definitions in clause 3 of the OHS Regulation).

**should** means an optional way of establishing a safe system of work. You can carry out an alternative method, but you would need to be able to demonstrate that it was a safe system of work.

**source of ignition** – see ignition source.

**supplier** includes a manufacturer, importer, wholesaler, reseller or distributor.

**use** includes the production, handling, storage, transport or disposal of a substance.

**worker** includes employees, self-employed persons and any other person carrying out work activity.

**workplace** – see place of work (above).

## CHAPTER 2 – LEGAL RESPONSIBILITIES

People who use or store agricultural chemicals in workplaces, or supply chemicals for use at work, have legal responsibilities under the *Occupational Health and Safety Act 2000* (OHS Act) and the *Pesticides Act 1999*. Employers and the self-employed have an obligation to establish and maintain a safe system of work.

Other legislation requires chemical users to take steps to protect the environment, including taking care when disposing unwanted chemicals.

This code provides advice which will help you comply with the relevant legislation and adopt a safe system of work. Inquiries about the pesticides legislation should be directed to the Department of Environment and Conservation (web site [www.dec.nsw.gov.au](http://www.dec.nsw.gov.au)).

### 2.1 *Pesticides Act 1999*

Any chemical substance used for the control of pests must be registered with the Australian Pesticides and Veterinary Medicines Authority (AVPMA) for Agricultural and Veterinary Chemicals (NRA) before use.

Under the *Pesticides Act 1999* all pesticide users must:

- use only pesticides registered by the AVPMA that are approved for the intended situation of use
- read the registered label on the pesticide container (or have them read to the user) and strictly follow the label directions
- not risk injury to persons, property and non-target plants and animals through the use of the pesticide
- obtain an AVPMA permit if the user wishes to vary the label directions or use pattern
- make a record of pesticide applications (see the advice in chapter 13)
- be trained.

Use and disposal of pesticides is subject to requirements enforced by the environmental legislation and relevant authorities such as local councils. Enquires should be directed to the Department of Environment and Planning. Information, such as training competencies, can be found on the web site [www.dec.nsw.gov.au/pesticides/training.htm](http://www.dec.nsw.gov.au/pesticides/training.htm)

### 2.2 Occupational health and safety legislation

The OHS Act imposes general obligations on employers, those self-employed, suppliers and employees which are intended to ensure the health and safety of all those in workplaces including visitors (such as students on work experience). These obligations apply to chemicals used in workplaces.

The OHS Act is supported by the OHS Regulation which provides detailed requirements for the supply and use of hazardous substances and dangerous goods in workplaces. This code provides guidance about how to comply with these requirements. Many of the pesticides registered under the Pesticides Act are classified as hazardous substances and/or dangerous goods by the OHS Regulation.

When these pesticides are supplied or used in a workplace, the requirements of both the OHS Act and Pesticides Act and corresponding regulations apply. The classification of chemicals into the categories of poison, hazardous and dangerous, and identification on the label is the responsibility of manufacturers and suppliers (see section 2.5).

## 2.3 Employers

Under the OHS Act employers must ensure the health, safety and welfare of their employees and other persons at their place of work. This includes preventing health risks created by the use and storage of chemicals. Employers have specific obligations to carry out the following:

- ensure that information is available so that chemicals can be used safely and without risks to health
- provide employees with instruction, training and supervision
- provide safe systems of work, including the use of plant and equipment.

Employers must also protect the health and safety of other persons who are not their employees, such as contractors and their employees, or members of the public. This includes risks arising from the application of pesticides, spray drift and any residues left after application. These functions may be delegated to a manager.

## 2.4 Self-employed persons

Self-employed persons have the same responsibilities as employers to others at the workplace, under the OHS Act. The OHS Regulation specifies that a reference to employer duties also applies to self-employed persons. Since they do not have employees, some aspects do not apply. However, meeting the relevant requirements of this Code will help protect the health of self-employed persons.

## 2.5 Sources of information – suppliers of chemicals

Manufacturers and importers are responsible for the following:

- classifying hazardous substances and dangerous goods (including those that are pesticides)
- preparing and providing material safety data sheets (MSDS) for any hazardous substance or dangerous goods that they supply for use in a workplace.

Suppliers, including resellers, are responsible for:

- ensuring containers of chemicals which are classified as hazardous substances, dangerous goods and pesticides are properly labelled or placarded
- providing MSDS to end users for any hazardous substances or dangerous goods they supply for use at work.

Labels for pesticides approved by the AVPMA when the pesticide is registered under the *Agricultural and Veterinary Chemicals Code Act 1994* (of the Commonwealth), are usually suitable labels.

## 2.6 Retailers and resellers

A retailer is someone who sells to any member of the public who is an end user. Retailers (eg supermarkets and hardware stores) are not required to provide MSDS to customers. However, retailers of chemicals in rural areas should provide them to purchasers on request.

Resellers and trade sales outlets are not retailers and so must provide end users with MSDS. Trade sales include sales of substances or goods intended solely for use in workplaces.

## 2.7 Employees

An employee working with or near chemicals has a responsibility to maintain safe work practices, to protect their own health and safety and that of others at the workplace.

Employees must report promptly to their employer anything which in the employee's view may affect compliance with any relevant legislation.

The general duties of employees are set out in Sections 20 and 21 of the *Occupational Health and Safety Act 2000*.

## 2.8 Licensing of aerial applicators

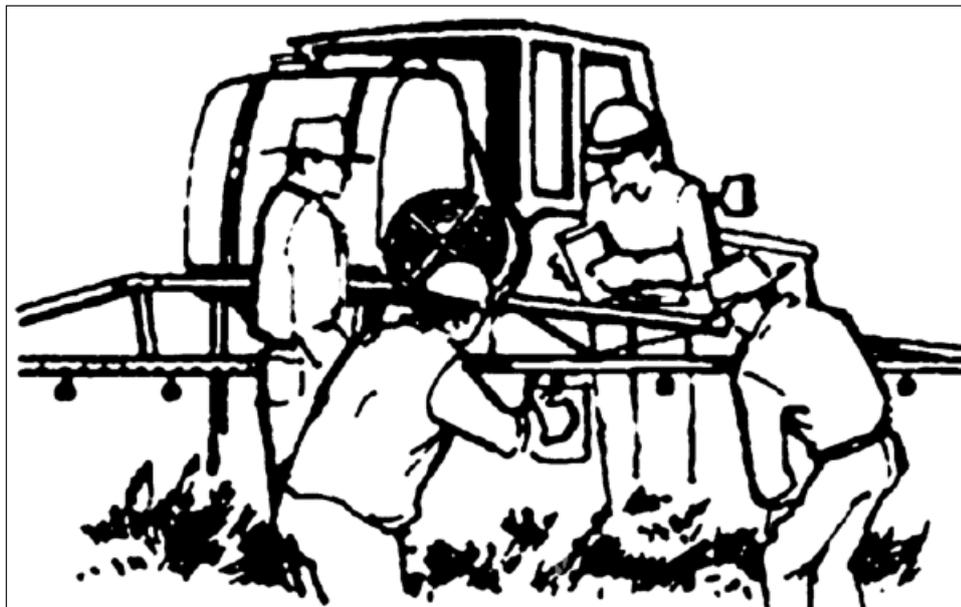
Under the *Pesticides Act 1999*, aerial applicators of pesticides must be licensed. Inquiries about this licensing should be directed to the Department of Environment and Conservation (web site [www.dec.nsw.gov.au](http://www.dec.nsw.gov.au)).

## 2.9 Use of this code

In this code, words such as “should”, “may” or “consider” indicate recommended courses of action. This has the evidentiary status accorded to codes of practice. However, you may choose an alternative method of achieving a safe system of work.

Words such as “must”, “requires”, and “mandatory” indicate legal requirements with which the relevant person must comply.

Consider using this code to help you develop an industry best practice approach to occupational health and safety in your workplace.



## CHAPTER 3 – CONSULTATION WITH EMPLOYEES AND CONTRACTORS

Employees must be consulted and advised on chemical issues that may affect their health and safety (OHS Act section 13), since employees know their jobs and often are able to identify risks, and contribute to the risk assessment process.

The OHS Act requires employers to ensure that consultation occurs with employees during the identification and assessment of risks, the development of control measures and changes to systems of work that may affect health and safety (OHS Act section 15). Consequently, employers should consult with employees about the implementation of this code of practice.

Consultation involves the sharing of information and the exchange of views between the employer, employees and their representatives, or contractors. Consultation should include seasonal workers. It provides the opportunity to contribute to decision making in a timely fashion to pre-empt or resolve any problems. Consultation fosters cooperation in the workplace.

In a small workplace, consultation can take the form of an informal discussion between employer and employees, and other persons including contractors, over the content of an MSDS, or during an inspection of the work. In a large workplace, with a number of employees, it may be appropriate to use a formal process through a workplace occupational health and safety committee. Guidance on consultation arrangements and undertaking consultation is provided in the *Code of practice: OHS consultation*.

### 3.1 What consultation should address

In relation to the use and storage of chemicals, address:

- (a) identifying hazards and assessing risks associated with the storage and handling of chemicals
- (b) planning the introduction of a new chemical, new application method or modifying an existing process
- (c) deciding on control measures and how their use and maintenance can be checked
- (d) training requirements
- (e) communication with a contractor (where appropriate)
- (f) advice on particular chemicals
- (g) selecting and wearing PPE (personal protective equipment)
- (h) administrative measures adopted in your workplace
- (i) the role of air monitoring and health surveillance, and the choice of a medical practitioner (when applicable at workplaces where these procedures are carried out).

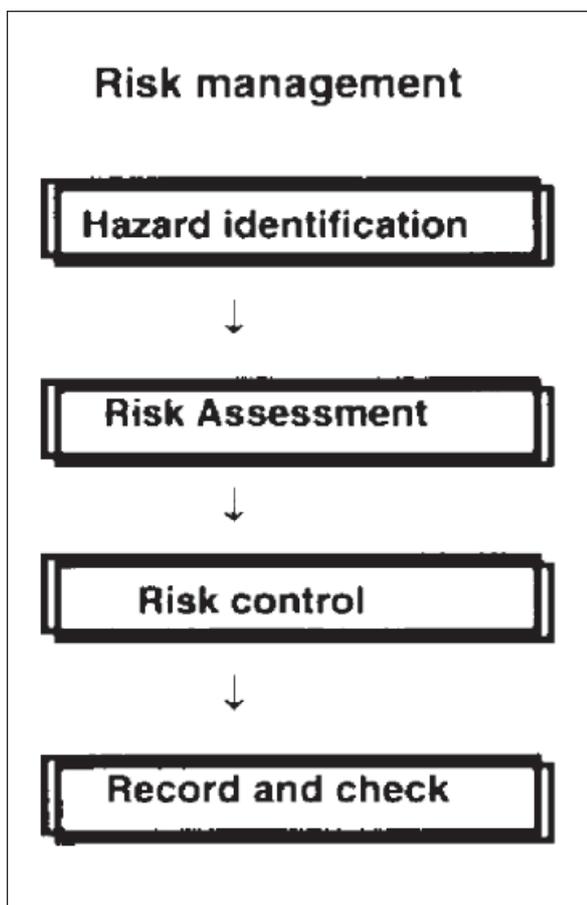


## CHAPTER 4 – OVERVIEW – MANAGING THE RISKS OF CHEMICALS

The aim of the risk management of chemicals is to minimise or eliminate illness or injury by going through the following steps:

- identifying the chemical hazards
- assessing the degree of risk created by the chemical hazards, in storage and work processes
- eliminating risks, or if this is not reasonably practicable, determining appropriate measures to control risks including improving existing controls
- ensuring appropriate supervision of workers
- ensuring appropriate instruction, information and training is provided to workers
- recording any action or work procedure established for the workplace
- checking the implementation and success of control measures.

The aim of this code is to help you establish practical methods appropriate for your workplace and take steps to establish a safe system of work.



### 4.1 The types of risks

Risk assessments should be made in the following three major areas:

- Risks to users from the preparation and use of chemicals, where the emphasis is on controlling contact with chemicals (see chapter 6).

- Risks to others from spray drift, contamination (eg crop re-entry) and disposal (see chapter 8).
- Risks to persons, property and the environment by accidental events such as spillage or fire in storage or transport (see chapters 10 and 11).

In addition, under the OHS Regulation, you may need to assess all other types of risks such as those arising from manual handling and the use of plant and machinery.

## **4.2 Identification of hazards**

Chemical hazards can be identified from the label on containers and the MSDS for the chemicals supplied to you (see chapter 5).

Hazards created by work, such as the generation of fumes or dust, may not be covered by an MSDS and so other relevant information should be sought. Examples are welding, cutting, or grinding, or entry into dusty areas such as a silo. Information should be obtained about health effects, precautions for use and safe handling. Seek advice from an expert or authority such as WorkCover.

If you undertake work such as essential oil distillation, then you take on the manufacturer's legal obligations to produce an MSDS.

Risks from the biological or explosion hazards arising from organic dusts are not covered in this Code of Practice. You may also need to consider the physical risks arising from pressurised equipment.

## **4.3 Assessing risk**

A risk assessment is based on information supplied on the label and/or MSDS, and involves an inspection of the actual work location and work practices. In some situations it may be necessary to obtain specialist advice.

This code will help you examine the work practices related to storage, handling and use and then estimate the risk to employees and other persons, property and the environment.

Review risk assessments when:

- work practices change
- a new chemical is introduced
- when an updated MSDS is produced by the supplier
- need is indicated by adverse results of health surveillance or monitoring
- five years has elapsed since the last assessment (check that you have the latest MSDS).

## **4.4 Controls**

Controls are methods that eliminate or reduce the risks of chemical accidents and exposures. Controls and their maintenance must be part of any plan to introduce a chemical into the workplace. The continuing use and effectiveness of controls should be checked.

#### **4.5 Records and the register of chemicals**

Maintaining records is an important part of risk management and risk assessment.

The starting point is forming the register, which includes a listing of all hazardous substances and dangerous goods in a workplace. The minimum information that must be included in a register is a list of all hazardous substances and/or dangerous goods used or produced in the workplace and the relevant MSDS (OHS Regulation clauses 167, 174ZW). Note – some chemicals will have both a hazardous substances and a dangerous goods classification. There are a number of ways of forming a register – see section 13.2.1.

See step 8 of section 6.4 for more advice on recording exposure risk assessments and Appendix 1 for a way of recording a storage risk assessment.

Other types of records are also described in chapter 13.

## CHAPTER 5 – IDENTIFICATION OF HAZARDS – SOURCES OF INFORMATION ABOUT CHEMICALS

Information about the hazards of a chemical can be found on the container label and the MSDS. This information should be used to assess risks and establish control measures. Additional advice can be found in other publications produced by the pesticide manufacturer, importer or supplier, which give advice on the intended method of use of the chemical and suitable application equipment.

For emissions such as welding fumes, or dusts, the above sources of information may not be available and so equivalent information should be sought. Common hazardous substances are listed in the *List of Designated Hazardous Substances*. This information is available online by searching the Hazardous Substances Information System (HSIS) on the web site [www.ascc.gov.au](http://www.ascc.gov.au).

### 5.1 Labels

The purpose of labelling is to ensure correct identification, use and disposal of the chemicals in a package. A “package” is a container of a capacity less than bulk. Labels must be kept fixed to the package at all times.

Hazardous substances, dangerous goods and poisons, all have similar labelling provisions. Pesticide labels show the active ingredients and indicate other hazardous or dangerous ingredients (eg by showing dangerous goods symbols).

Some packages of pesticides have labels that contain extensive information in booklet form that is inserted into an envelope or pocket on the container. These booklets should be returned to the envelope or pocket after use for future reference. Some gas cylinders have tags which display the relevant information.

The *Pesticides Act 1999* requires that a person using a registered pesticide must read the instructions on the label, or have the instructions read to them by another person, before preparing or using a pesticide. The instructions covering the concentration of the mixture and the application must be followed, unless there is a permit to do otherwise. Each pesticide registered for sale has been approved for use under conditions specified on the label. These conditions should be considered when estimating and controlling risk.

Stores containing packages of dangerous goods over certain quantities and bulk containers such as tanks require placards under the OHS Regulation (see chapters 11 and 12). Generally, these dangerous goods requirements do not apply to chemicals mixed and diluted for use.

### 5.2 Material safety data sheets (MSDS)

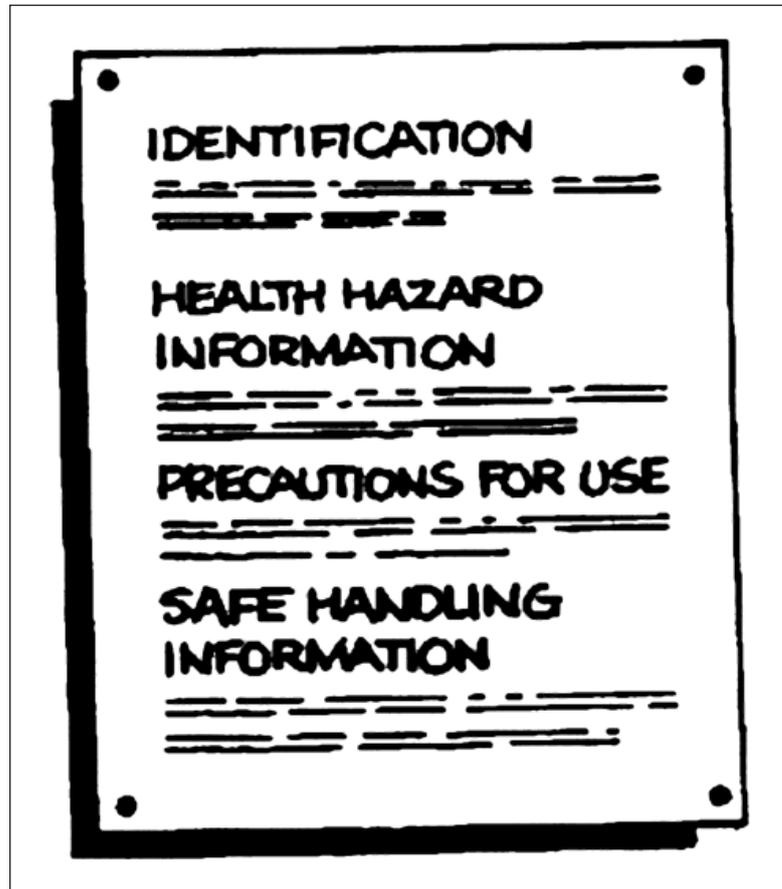
Material Safety Data Sheets (MSDS) provide information on each hazardous substance and dangerous goods additional to that on a label. Methods to control risks including exposure risks, and relevant exposure standards can also be found in the MSDS. An MSDS for a substance provides the following information:

- identification
- health and physical hazard information, including dangerous goods classification if applicable
- precautions for use at application strength, including the exposure standard
- safe storage and handling information
- all the hazardous and/or dangerous ingredients, not just the “active constituent”

- where a chemical may release another hazardous substance during normal use such as when reacting with other common materials or when heated
- emergency procedures (to assist planning).

Use MSDS for guidance on the safe use and storage of chemicals. Other persons working in the area where the chemical is being used may also need to see the MSDS.

MSDS are not available (nor required) for hazardous substances produced by the work such as dusts or fumes.



### **5.3 Obtaining MSDS and provision of MSDS to others**

#### **5.3.1 Obtaining MSDS from the supplier**

A supplier must provide an MSDS for each chemical classified as a hazardous substance or a dangerous goods on request and for the first supply (OHS Regulation clauses 155 and 174M).

Retailers, such as hardware stores and supermarkets, are not required by law to provide MSDS for consumer packages.

A reseller, such as a person who supplies to trade only, is not a retailer (since they are not dealing with consumer packages) and so must provide MSDS. Trade sales include substances intended solely for use in workplaces, and so MSDS must be provided to you on first supply and on request.

#### **5.3.2 Employer duties**

MSDS must be made available to employees who may be exposed to the hazardous substance in use or dangerous goods handled or stored (OHS Regulation clauses 162 and 174ZG).

Access to MSDS may be required:

- during training (including induction)
- during consultation before the introduction of a new substance
- when an employee is working with or near the chemical (eg when it is applied)
- when working in the storage area.

At each workplace, or designated work area, where hazardous substances or dangerous goods are stored or mixed, ensure that:

- employees have easy access to an MSDS for each substance stored or used
- the most recent edition of the MSDS is available (check every five years)
- any information retrieval system for MSDS is kept in working order
- employees are trained on how to access and understand the information.

### 5.3.3 Self-employed persons

Self-employed persons should note that to meet their responsibilities to others under the OHS Regulation they should make an MSDS available to others at the workplace for the substance in use. Contractors should make MSDS available to others at the site including employers and their workers.

## 5.4 Decanting

Decanting should be avoided because of the difficulty of maintaining identification of decanted contents in new containers, unless used immediately. An example of immediate use is when measuring out an amount of pesticide and pouring it directly into a spray tank.

A chemical must not be transferred from one container to another (decanted), unless both containers are properly labelled.

A chemical should be decanted only into another container designed for the chemical. Some chemicals can react with the container, if the wrong type of container is used.

Do not decant a chemical into a food or beverage container.



## 5.5 Labelling of pesticide application equipment

When the pesticide is in the application equipment, such as a small spray tank, signs or labelling are not required where all of the following are observed:

- it is filled with a pesticide that has been prepared or diluted ready for immediate use
- it will be controlled by the applicator
- there is a low risk of any other person misusing it.

If the diluted pesticide is in a tank and not used immediately, it should display a warning sign with at least the following words:

POISON (followed by the common name of the pesticide)

AVOID CONTACT

HAZARDOUS PESTICIDE

This includes a tank carried on a vehicle such as a tractor or truck but not a portable tank such as a knapsack spray.

Unused diluted pesticide should be disposed of (see section 8.3) or kept in a labelled container.

## 5.6 Container that is not properly labelled

Under the *Pesticides Act 1999*, a pesticide must not be used from a container that does not have a registered label fixed to it. All unlabelled chemical containers should be identified or disposed of promptly.

If the label has been lost and the contents of a container are known, attach a temporary label. If the product name is unknown it should be labelled: 'CAUTION. DO NOT USE. UNKNOWN SUBSTANCE' and then stored securely or disposed of as a hazardous waste by a commercial waste contractor.



# CHAPTER 6 – ASSESSING EXPOSURE RISKS

## 6.1 Legal duties

### 6.1.1 Duty to assess risks

Employers and self-employed persons are required by the OHS Regulation to assess the:

- health risks of all work with chemicals and other substances that are classified as hazardous substances
- physical risks of dangerous goods.

This includes chemicals that are in current use and new chemicals when they are introduced.

### 6.1.2 Scope of the risk assessment

Risk assessments must include risks to seasonal and casual workers, and risks to non-employees at the workplace. Self-employed farmers and contractors must assess the health and exposure risks to *other persons* working at the site.

Employers and self-employed persons also have a duty of care to members of the public who may later come into contact with hazardous residues.

Even though pesticides are assessed for health hazards before registration, risks vary with the way a pesticide is used. Consequently, it is important to assess the health and safety risks arising from the *actual circumstances* of use at *your* workplace, including the method of application, equipment used and the weather. Off label use may require a thorough risk assessment as the label precautions may not apply. The permit directions must be followed.

Use the risk assessment to examine the effectiveness of existing controls.

Detailed advice on the hazards and risks associated with dusts and gases produced in crop storage, such as in silos, is provided in the *Code of practice for the safe use of bulk solids containers and flatbed storage including silos, field bins and chaser bins*.

### 6.1.3 General risk assessments

If hazards identified as being likely to arise in the conduct of an employer's undertaking are of the same kind but arise in different places or circumstances, a general assessment of risk is sufficient compliance with the OHS Regulation so long as it has been applied to each such place or circumstance.

You can use a general assessment for several locations or occasions where the hazard and degree of risk are comparable, such as where the same chemical is used in a number of different locations in similar circumstances. Examples are applying a particular herbicide to a pasture, or when jetting sheep. The use of general risk assessments will simplify the overall task of assessment of the different locations where you work.

This may be of particular use to contractors who do similar tasks in a number of different locations. Relevant variable factors should be included (eg weather) and any limitations specified.

To apply general assessments you must ensure that the work practices, equipment and materials are the same in each case.

You may need to specify controls such as not doing work when weather conditions are unfavourable. For example, you might specify in the risk assessment the wind speeds that are too high or too low.

## 6.2 Routes of exposure to health risks

There are three main ways chemicals can enter the body, called routes of exposure. Consider each possibility separately when conducting a risk assessment:

- **Inhalation** may be an important route of entry. Exposure occurs by breathing in airborne concentrations of a chemical in the form of an aerosol, vapour, mist or suspended dust. For example, consider this risk when spraying.
- **Skin contact** is a common route of entry. Many chemicals are readily absorbed through the skin or eyes. For example, consider skin contact risks when mixing sprays. Formulations which contain solvents and surfactants may increase skin absorption. Higher temperatures or humidity may increase absorption.
- **Ingestion** (swallowing) is normally a minor route of exposure, except in the cases of accidents such as splashing while mixing or spraying. Smoking or eating while handling chemicals is often the cause of ingestion. Dusts and aerosols can be breathed in and then swallowed.

An additional route of entry is the risk of injection from “stick” injuries – for example vaccination needles when using veterinary chemicals, or from injector guns.

## 6.3 Exposure standards and air monitoring

The OHS Regulation requires employers (and the self-employed) to control exposure to ensure that exposure of an employee, or other persons at the workplace, to hazardous substances is prevented, or if that is not practicable, minimised.

Exposure must not be greater than the relevant exposure standards in the NOHSC publication *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*. This information can also be found on the web site [www.ascc.gov.au](http://www.ascc.gov.au) by searching the Hazardous Substances Information System (HSIS).

This is relevant where inhalation is the main route of entry. Not all hazardous substances have an exposure standard. The exposure standard is given in the MSDS, if a standard has been allocated. It may relate to an individual component of the spray mixture such as the solvent or surfactant. Exposure standards are of most relevance to those workers who use chemicals regularly and continuously as part of their daily duties (including contractors).

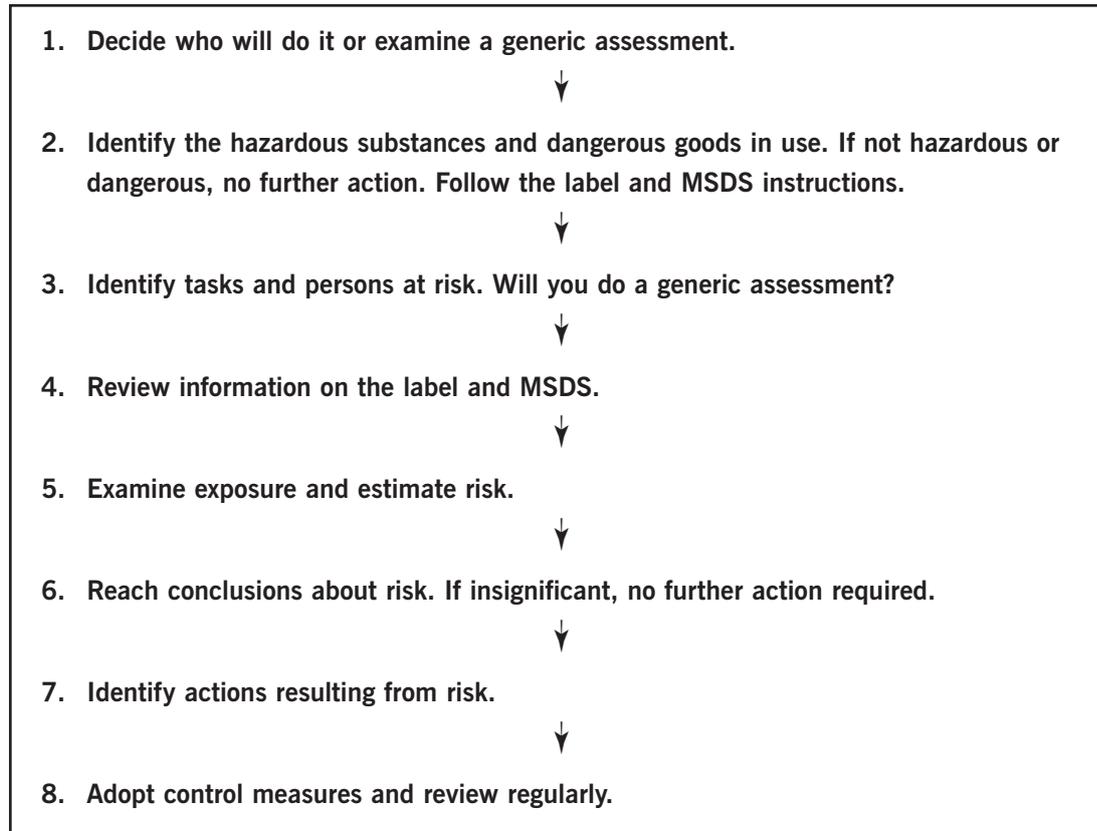
If spraying produces vapours, aerosols or particles in the air, then for the purposes of a risk assessment, it may be appropriate to assume that the airborne exposure standard is likely to be exceeded and that control measures such as respirators or other PPE are necessary. For chemicals used in agriculture, strict compliance with the safety directions on the label and MSDS will normally ensure that exposure is sufficiently controlled so that quantitative measurement will not be necessary.

If there is uncertainty about risks, it may be necessary to measure airborne concentrations and compare these with the mandatory exposure standards. This may be useful for fixed locations such as indoors or situations of off-label use. Care must be taken when applying these to outdoor situations where conditions are variable, such as changes in the wind.

These measurements are normally undertaken and interpreted by a qualified occupational hygienist.

## 6.4 Eight step risk assessment

Flow Chart – Risk Assessment



Use the eight step plan below to carry out a risk assessment:

### Step 1 Decide who will do the assessment and where

Most employers or contractors should be able to do a simple assessment. In large organisations, the employer might delegate this duty to someone with a sufficient knowledge of the workplace. Labels, MSDS and other supplier information provide the basis for the risk assessment.

However, you may need to seek expert advice where there are doubts about the degree of exposure and there is a need for a more complex risk assessment (see step 7).



## Step 2 Identification of hazardous substances and dangerous goods

Identify all chemicals from the labels and MSDS.

Stock lists and inventories are useful, particularly if the inventory is marked with the category of poison or dangerous good at the time of purchase.

Hazardous dusts and other emissions from items not covered by a label or MSDS, such as the generation of dusts, welding fumes, or skin contact when handling pesticide treated timber should also be considered.

From the label, identify the pesticides, herbicides or chemicals which are classified as:

- dangerous goods
- hazardous substances
- scheduled poisons.

These classifications can be identified from symbols or words on the label or MSDS. Dangerous goods will show a “diamond” symbol and a “UN” number – see appendix 5 for symbols. If you have dangerous goods, you may also need special storage arrangements (see section 11) in addition to the assessment of health risks covered in this section.

Then list these in a register, in the form of an inventory, together with the relevant MSDS. Also list any additional hazardous substances *created* in the workplace, such as dusts and fumes, on the register (these do not need MSDS).

Some herbicides and pesticides (eg those with low human toxicity) may not be hazardous or dangerous, and so the remaining steps of the risk assessment will not be necessary. However, an assessment of environmental risk may be necessary.

## Step 3 Identify persons at risk and tasks

Divide up the work activities into units for assessment, based on the different chemicals used. Look at each job or task using each chemical separately. For example:

- (a) preparing, mixing or diluting (including handling the concentrate);
- (b) applying, such as spraying;
- (c) handling in the storage area;
- (d) loading and handling on vehicles;
- (e) other tasks such as welding or degreasing;
- (f) treating buildings, silos and other situations where contact with hazardous residue is possible;
- (g) cleaning, adjusting and maintaining equipment;
- (h) dusts from grain handling or contaminated land (such as around dips); and
- (i) access by workers to treated areas or contact with hazardous residue.

Use the list in section 6.7 as a checklist of high risk activities.

#### **Step 4 Review the information from the label and MSDS**

For each chemical find out the following:

- the degree and type of hazard (eg flammability, toxicity, risk of cancer or foetal damage)
- routes of exposure likely during use
- recommended control measures.

The degree of the hazard is indicated on the label and in the MSDS. For example, find out the poisons schedule number – 5 is the least toxic, 6 is intermediate toxicity and 7 is highly toxic. Do not just focus on the “active” ingredient. The most toxic component of the pesticide mixture may not be the active ingredient but could be the surfactant, such as a glycol, or the solvent used, such as xylene. Hazards are indicated by the “risk phrases” on the label.

Check your existing control measures in use and compare these with the recommendations on the MSDS and label, including the “safety phrases”. If you have a permit for off-label use, then the label recommendations may not apply, in which case you must follow the permit conditions instead. If you are not using the recommended controls, then you will need to take steps to adopt these (see chapter 7).

#### **Step 5 Estimate exposure and risk**

To estimate exposure and risk, inspect the work practices and existing control measures. The risk assessment may vary with the form of the substance (eg powder versus liquid) and the method of application.

To estimate exposure consider:

- evidence of contamination – visible dust or fumes, dust on surfaces, skin or clothing, visible leaks, spills, or residues, odour
- direct contact with the substance, such as handling powder without gloves
- splashes
- experience or symptoms of exposure
- likely vapours or hazardous residues remaining after the application of the chemical
- spray drift
- hot working conditions where absorption through skin occurs more readily as a result of increased blood supply to the skin.

Health risk is a combination of hazard (toxicity) and dose. Dose is the amount entering the body as a result of exposure. The dose is affected by both of the following:

- likelihood of exposure
- length of time of exposure.

Also consider flammability risks – such as decanting near sources of ignition.

#### ***Likelihood of exposure***

The likelihood of exposure should be determined. This depends on a number of factors. The most important are: the hazard itself, the type of work done (task), and how it is being done.

Factors to consider include:

- the situation (eg is it an enclosed space or well ventilated?)
- the form of the substance (eg is it a powder or a vapour? Does this change with temperature?)
- are workers using the Personal Protective Equipment (PPE) prescribed on the label or in the MSDS?
- are engineering controls such as ventilation correctly used?
- how often is the chemical used?
- the likely airborne concentration of the chemical in comparison to the exposure standard
- spray or dust drift and the factors such as particle size, wind speed and temperature (see also advice in sections 8.2 and 8.3).

***Length of exposure (contact time)***

The length of time a person is in contact with a chemical directly affects the dose. Also consider the possible contact others may experience, for example pickers in a field. Workers who use a chemical every day will have a much higher potential exposure than employees who use chemicals only occasionally, as part of other duties.

Contact time and contact area of skin are important in estimating the dose. Skin contact can be estimated by observing the actual circumstances of the work activity. Is the appropriate PPE being used?



For example, if a knapsack spray is being used and a pesticide leaks out of the unit and over clothing, the operator will be in contact with the pesticide until the contaminated clothing is removed. If the clothing is not immediately removed, this will increase the length of time when skin absorption may occur.

**Step 6 Reach conclusions about risk**

***Significant risk***

A 'significant risk' means that the work could adversely affect the health of people in the workplace. Consider the outcome in terms of possible health effects.

Examples of significant risk factors are:

- exposure is high (eg the length of time and/or likelihood is high)
- the chemical is highly toxic (even if exposure time is short)
- the health effect is severe – both the chronic (long term) effects and the acute (short term) effects should be considered (check the MSDS)
- leaks or spills might occur
- the individual is particularly susceptible (eg evidence of previous allergic reactions, pregnant or breast feeding).

### ***Reaching a conclusion***

There are four possible conclusions about risk:

1. No significant risk if it is unlikely that the work will adversely affect the health of people in the workplace. This may be an appropriate conclusion if all the label and MSDS instructions and PPE are followed. However, this may not apply to off label use.
2. The risks are significant but effectively controlled, but could increase in the future. Consider if there is a need for monitoring or health surveillance.
3. The risks are significant, and not adequately controlled. Consider immediate control measures or re-designing the process, and then determine if monitoring or health surveillance is required (see section 6.5 below). Seek expert advice if needed.
4. There is uncertainty about the risks, there is not enough information about the hazards or there is uncertainty about the degree of exposure. Seek expert assistance, or more information, to do a more detailed assessment.

## **Step 7 Identify actions resulting from conclusions about risks**

If the work evaluation shows that exposure is, or can be, readily controlled in accordance with the MSDS and label, then you may conclude that there is no significant risk to health. The risk assessment is complete. This will usually apply to chemical use if you have followed the label and MSDS directions. The record of assessment may just be a notation on the relevant MSDS in the register.

You may have to include a note on the conditions of use, such as not using the chemical during adverse weather conditions.

Where the assessment indicates that there is a significant risk to health:

- select appropriate measures to achieve and sustain control (see section 7)
- ensure that those control measures are properly used and maintained
- arrange induction and training, especially in areas where the assessment indicates risks are not easily controlled
- determine if air monitoring or health surveillance are required, and whether or not it is needed on a regular basis – see section 6.4 for more advice on health surveillance.

### ***Air monitoring and exposure standards***

Air monitoring may be useful in fixed locations, such as indoors. Such measurements are normally undertaken and interpreted by a qualified occupational hygienist. For the purposes of risk assessment, it may be appropriate to assume the exposure standard is exceeded if aerosols or other suspensions are produced.

## **Step 8 Record conclusions about risk and adopt controls**

Details of recording an assessment of risk and the controls chosen are covered in the next section on control measures (see section 7.3). Once controls are introduced their use should be reviewed regularly.

A step by step checklist to help risk assessment is given in appendix 6.

### **6.5 Health surveillance**

Advice should be sought from an authorised medical practitioner when health surveillance is necessary. The following advice is a guide to when it may be required and the steps you should take.

Health surveillance of workers is the health assessment of a person to identify any changes resulting from exposure to a chemical. It may involve a medical examination and taking blood or urine samples. Adverse results would indicate the need to revise the risk assessment and implement better control methods.

The need for health surveillance should be determined as part of the risk assessment process, when identifying conclusions from risks (section 6.4, step 7 above). This is particularly important for contractors who are regularly exposed to pesticides. To help with this decision, the advice of a WorkCover authorised medical practitioner may need to be sought when preparing the record of the risk assessment. This could be in the form of a written plan of action, for the circumstances of use in your workplace, identifying control measures and the occasions on when health surveillance will be required. Remember that improved control measures (see section 7) may reduce the need for health surveillance.

Health surveillance is not the primary means of managing occupational exposure and is not an alternative to control measures. It is used to:

- check control measures by confirming that the absorbed dose is below the accepted level (the dose may arise either from use or contact with hazardous residues)
- detect biological effects requiring cessation or reduction of exposure
- collect data to evaluate the effects of exposure over a period of time.

#### **6.5.1 Requirements under the OHS Regulation**

The OHS Regulation (clause 165) requires that health surveillance be undertaken for employees using a pesticide containing organophosphate pesticides (see anti-cholinesterase on the label or MSDS) and who have been identified as having a risk to their health.

For other hazardous substances, the OHS Regulation also requires health surveillance for employees who have been identified as having a risk to their health, if a suitable method of examination or biological test is available (clause 165). Tests are available for some herbicides, and pesticides containing heavy metals. The effect of exposure to anticoagulant rodenticides such as bromadiolone or brodifacoum can be detected by measuring the ability of blood to clot.

Periodic health surveillance should also be considered for all workers who are exposed to a variety of chemicals and/or pesticides for considerable periods of their work time (eg spraying contractors).

Employees and others working in the industry should participate in the health surveillance program, unless there is some compelling reason not to. These reasons should be discussed with the medical practitioner responsible for the program.

You may need to consider including casual or seasonal workers in the program if they move from one area to another to ensure adequate coverage of their exposure.

### 6.5.2 When health surveillance should be undertaken

Consider undertaking health surveillance in the following situations:

- (a) At the onset of poisoning or symptoms of exposure. Poisoning can result from either a single large dose or through cumulative effects of small doses over a number of days. If you suspect pesticide poisoning, always arrange for a health check the same day, or as soon as practicable.
- (b) At least once per year for workers regularly exposed to chemicals. For example, a yearly examination during periods of potential exposure, such as the middle of a spraying season or during any periods which involves the regular use of pesticides.
- (c) When using organophosphate pesticides (see advice below).

Observe the following procedures and criteria for organophosphate pesticides:

Establish a baseline at a time when there has been at least four weeks without exposure. This is to measure a baseline cholinesterase level in each individual worker prior to exposure where organophosphate pesticides are used. It is recommended that blood be taken again within a few days of using the pesticide. To assist the medical practitioner, each worker should bring a written record of the names of the pesticides and dates of use (eg a copy of the record of use form).

For very occasional use no test is needed, unless the person has symptoms which could be related to exposure. Very occasional use is periods of half a day per month or less. However, for seasonal or casual workers, you may need to consider whether they have been exposed at other work locations.

Intermittent use is two or three days at a time, all day, with gaps of a month or more between use. A test during a period of use provides feedback on the effectiveness of control measures.

Seasonal use is 4 days per week or more, for periods over a season. Test early in the season (eg on the last day of the first week, when work practices have settled) to check on the effectiveness of control measures. The medical practitioner will judge the need for further tests based on the nature of the work and previous test results.

### 6.5.3 Arranging health surveillance

An authorised medical practitioner should be consulted for advice and to supervise the health surveillance program. For a list of authorised medical practitioners, contact WorkCover on 13 10 50.

If health surveillance is required, the employer should:

- (a) Consult with employees and inform them of the purpose and procedures for health surveillance.
- (b) Seek advice from the medical practitioner on procedures and how frequently it should be done. The practitioner must follow the health surveillance procedure in clause 165 of the OHS Regulation if the risk assessment shows a *significant* risk of exposure.
- (c) Arrange for people to carry it out (eg a person to take blood samples).
- (d) Provide the medical practitioner with access to a list of hazardous substances for which the health surveillance is required, the MSDS, the exposure standards, and risk assessment reports.
- (e) Make acceptable arrangement for employees to participate in the health surveillance program.
- (f) Pay the expenses, including the wages of employees (see clause 165(5) of the OHS Regulation).
- (g) Keep records confidential (OHS Regulation clause 166(2)) and record information such as when it was done, names of workers, and the outcomes if adverse findings were advised by the medical practitioner.

Advice for authorised medical practitioners is provided in training and publications by WorkCover NSW and guidelines published by ASCC (web site [www.ascc.gov.au](http://www.ascc.gov.au)).

#### **6.5.4 Results of health surveillance**

The interpretation of health surveillance results is the role of the medical practitioner, whose advice must be followed by the employer.

If adverse results are obtained from health surveillance, action must be taken. These results can be used to identify where excessive exposure has occurred. Jobs and tasks must then be examined, and control measures introduced or existing ones reviewed to prevent recurrence. More frequent examinations may be necessary for individuals showing an adverse result.

### **6.6 Health effects of organophosphate pesticides**

The purpose of this section is to describe the health effects of organophosphate pesticides and why health surveillance may be necessary.

The organophosphate pesticides interfere with the normal functioning of the nervous system. They do this by blocking cholinesterase enzyme activity. This is the reason for calling the organophosphate pesticides “anticholinesterase compounds”.

The function of cholinesterase in the body is to prevent the build-up of acetylcholine in the nerve junctions by breaking it down. Acetylcholine is a chemical responsible for transmitting nerve stimuli. Consequently, a large reduction in cholinesterase leads to a build-up of acetylcholine which can result initially in sustained nerve transmission between nerve and muscle cells, and if levels are high enough this leads to sustained muscle contraction.

Two types of cholinesterase enzymes exist in blood: erythrocyte (red blood cell) cholinesterase and serum cholinesterase.

Red blood cell (erythrocyte) cholinesterase shows a sustained drop after organophosphate exposure and also reflects more closely how organophosphates affect the cholinesterase in the nervous system. Consequently red blood cell (erythrocyte) cholinesterase is taken as the best indicator of chronic exposure since it is the best estimate of cumulative exposure. However, it may not drop to its lowest level until several days after exposure.

Serum cholinesterase levels usually react more quickly to organophosphate exposure and so may be a more sensitive marker of exposure. However, serum cholinesterase levels also recover more quickly and may also be affected by other medical conditions.

#### **6.6.1 Entry into the body**

Organophosphate pesticides are readily absorbed through all routes of entry and can cause systemic toxicity. Systemic effects are whole body effects, that is body organs away from the site of absorption are also affected.

#### **6.6.2 Acute health effects**

Exposure to a concentrate or a highly toxic organophosphate pesticide may cause symptoms within minutes of exposure. Skin exposure to a working solution of an organophosphate pesticide may cause adverse effects in an hour or so. A splash in the eye may cause blurred vision due to persistent contraction of the eye muscle. Inhalation may cause bronchoconstriction (a decrease in the size of the air passages) and produce an excess of respiratory tract secretions. Splashes on the skin may cause localised sweating as well as localised muscle contractions.

### 6.6.3 Chronic effects

Continual exposure may cause persistent loss of appetite, weakness and malaise. Certain neurobehavioural effects may rarely occur such as twitching and loss of hand coordination.

Many organophosphate pesticides cause primary irritant dermatitis. A few are known to cause allergic contact dermatitis (eg parathion and malathion).

### 6.6.4 Carbamate pesticides

Carbamate pesticides may also affect cholinesterase activity. However this cholinesterase inhibition is reversed so quickly that in practice it is difficult to obtain a valid blood specimen before this occurs. For this reason monitoring cholinesterase activity for carbamate exposure is not usually recommended for routine health surveillance.

## 6.7 High risk activities – a checklist

Some activities create a high risk because they expose people to situations in which the chemical can be absorbed easily. These should be given special consideration when conducting a risk assessment. Examples are when pesticides are handled or used in the concentrated form (eg when mixing) or when application techniques may cause excessive exposure.

Use the following list of tasks as a checklist when assessing risk.

### Checklist – high risk activities

Activity	Risk factors
Mixing and loading spray tanks	<ul style="list-style-type: none"><li>• Handling liquids or dust in concentrate form.</li><li>• Pouring concentrates under awkward conditions where splashes are highly likely.</li></ul>
Marking for aerial spraying	<ul style="list-style-type: none"><li>• The marker has the potential to be exposed repeatedly to spray mist during aerial spray operations. Markers may absorb pesticide through the skin and by breathing in the spray mist. This risk can be reduced by using electronic swath markers.</li></ul>
Boom spray	<ul style="list-style-type: none"><li>• Filling tanks above head height increases risk of spills if manually performed.</li><li>• Wind blows spray onto the tractor operator.</li><li>• Operator is wet from waist down when adjusting nozzles.</li><li>• Operator blows or sucks blocked nozzles.</li><li>• Self propelled units with front mounted booms pose a greater inhalation risk.</li></ul>

Blower misters	<ul style="list-style-type: none"> <li>• Spraying trees poses a particular risk because the foliage canopy creates a tunnel effect. Fine spray mist is easily inhaled and also absorbed through skin of operator.</li> <li>• Blower misters create a fine mist which remains in still air for long periods or will drift to neighbouring properties. High exit velocity from blower can cause widespread contamination.</li> </ul>
Knapsack spray tank and other hand held equipment	<ul style="list-style-type: none"> <li>• Leaking equipment wets back, buttocks and legs of the operator. Hot working conditions increases operator absorption. Incorrect use of handpiece can cause spraying onto feet and legs leading to a high skin absorption rate.</li> <li>• Spraying above shoulder height may cause the operator to be covered by blow back of mist leading to skin exposure plus mist inhaled.</li> </ul>
Spraying by wand from tractor supply or ag bike tank	<ul style="list-style-type: none"> <li>• Feet and legs can be sprayed by mist deflected from plants and the ground. If the pressure is too high, a fine mist will be produced which may blow back on operator. Absorption is via skin and inhalation. Hot working conditions increase skin absorption.</li> <li>• Note that ag bikes and quads (ATVs) can become unstable if overloaded by a spray tank, leading to overturning and spillage.</li> </ul>
Fumigation	<ul style="list-style-type: none"> <li>• Fumigants move into the gaseous phase and are lethal due to the inhalation risk. Consider the risk of residues in area or material fumigated. Examples are the use of fumigants in grain silos or soil fumigation.</li> <li>• It is recommended that soil fumigation be carried out by a licensed contractor, holding a fumigation licence from WorkCover.</li> <li>• Carbon disulphide is readily flammable and combustible. Because it is easily ignited extra care is required to eliminate any source of ignition (including any static electricity from containers or clothing) or heat. It is also toxic and so carefully follow the label, MSDS and any other instructions from the supplier.</li> </ul>
Dipping	<ul style="list-style-type: none"> <li>• spray drift (in the case of shower dips)</li> <li>• dermal exposure,</li> <li>• timing of application (both seasonal and time of day),</li> <li>• PPE,</li> <li>• disposal of rinsate and wastes.</li> </ul>
Jetting	absorption via the skin, especially in hot working conditions

Hand dressing (eg to prevent fly strike in sheep)	<ul style="list-style-type: none"> <li>• dermal exposure</li> <li>• timing of application</li> <li>• site (eg not to be done in the shearing shed)</li> <li>• PPE</li> <li>• inhalation (from aerosols or dust)</li> <li>• spills, fumes or splashes.</li> </ul>
Enclosed spaces	<ul style="list-style-type: none"> <li>• Entry into buildings, where atmospheric contaminants will not disperse quickly. For example, fruit dipping in packing sheds.</li> <li>• Hand dressing of fly-struck sheep in shearing sheds.</li> </ul>
Confined spaces	<ul style="list-style-type: none"> <li>• Entry into silos, vats (eg in wine making), tanks or pits is controlled by clauses 66 to 78 of the OHS Regulation.</li> <li>• An Australian Standard, AS 2865 Safe Working in a Confined Space provides further advice.</li> <li>• Exhaust fumes from running pumps powered by internal combustion engines creates additional hazards and such engines should not be used in enclosed or confined spaces.</li> </ul>
Re-entry of crops after spraying	Dermal exposure from brushing against foliage – see section 8.5.
Welding	Fumes from welding. The exact hazard depends on the type of welding and the material being welded.

Advice on control measures are covered in the next two sections.

# CHAPTER 7 – MANAGING THE CONTROL OF CHEMICAL RISKS

The OHS Regulation requires that measures must be adopted that eliminate or, if that is not reasonably practicable, control risks. These include risks resulting from the exposure of any person to a hazardous substance and the physical hazards posed by dangerous goods.

The purpose of control measures is to eliminate or reduce exposure to chemicals in the actual circumstances of use and storage. It may be necessary to adopt more than one control measure to reduce exposure. Also consider controls that reduce environmental impact, including the reduction of waste. Take all the instructions on the label of pesticides into account when considering the practicability of control measures. Controls for storage are outlined in chapter 10.

Workplace exposures should always be kept as low as reasonably achievable, even where occupational exposure is quantified and exposure standards met.

## 7.1 The control hierarchy

The hierarchy of control will help you decide the best way to control risks. The hierarchy ranks control measures from the most effective to the least preferable. However, not all types of strategies will be practicable and more than one type of strategy may be needed for best exposure protection.

Methods to eliminate or control risk must be considered and adopted in the following order:

### 7.1.1 Elimination and reduction

Exposure to a chemical can be eliminated by removing the substance from the workplace, or by reducing its use.

For example, the use of a pesticide can be eliminated by removing the pest through manipulation of the environment. At the same time this can benefit production and the environment, including eliminating wastes.

Consider practices that involve:

- better hygiene
- removing pest breeding areas
- biological control and beneficial insects
- rotating crops or alternative crop varieties
- physical barriers
- biotechnology and integrated pest management (IPM)
- eradication.

Use these along with pest monitoring to reduce the frequency of chemical application (this is called integrated pest management, or IPM)

Do not use de-registered pesticides.

### 7.1.2 Substitution

It may be possible to substitute a chemical for a less hazardous one. Choosing appropriate containers will help reduce waste. Examples of substitution include:

- using a less toxic chemical
- using a less volatile chemical
- altering the physical form such as replacing an emulsifiable concentrate formulation with a granular formulation or encapsulated product to reduce the handling risks
- purchasing only returnable or reuseable containers.

### 7.1.3 Isolation

Isolation of the process can be achieved by distancing it from the rest of the workplace or by a physical barrier between the process and any person. Examples of isolation include:

- (a) separate areas used for storing, mixing and preparing pesticides with limited access to all but properly authorised employees.
- (b) using an air-conditioned truck or tractor cabins with properly functioning and maintained activated carbon filters designed to remove pesticide vapours.
- (c) carriage of chemicals in a section of a vehicle isolated from the driver and passengers during transport.
- (d) storage in a separate building or fenced area.
- (e) fencing off a contaminated dip site.
- (f) closed chemical transfer systems which reduce the risk of contact with concentrate (eg induction hoppers, direct injection).

If using an air-conditioned cabin, observe the following precautions: Check door seals for wear. Keep windows, doors and hatches or vents closed and air-conditioning on recycle during operations. Carbon filters must be maintained properly. Consider wearing a respirator if a carbon filter is not available. (At present there is no Australian Standard applying to vehicle carbon filters). The use of air-conditioning without carbon filters on “recycle” could contaminate the cabin over a period of time.

### 7.1.4 Engineering controls

An engineering control is a system which:

- minimises the generation or emission of a chemical
- suppresses or contains a chemical
- delivers the chemical in a way that reduces misting.

Types of engineering controls include the choice of application equipment, a local extraction ventilation system or an automated process. Consider engineering controls for indoor work if air contamination is likely, for example in a green house or packing shed.

Examples of engineering controls include:

- using an extraction ventilation equipment (ventilator) over a fruit dipping bath to remove solvent vapours
- changing nozzles to control droplet size or spray pattern
- using a purpose designed workplace with good natural or mechanical ventilation (to provide adequate air movement).

### **7.1.5 Administrative controls and work practices**

Administrative controls are planned work practices which enable you to manage risks. These include: the time of work, hours of work restrictions, taking wind and weather conditions into account, and restricting who does the work and who has access to a work area or chemical store. Administrative controls are implemented to ensure safe work practices are adopted in the workplace and that environmental impact is minimised.

Examples of administrative controls include:

- (a) Reducing the number of persons exposed and excluding non-essential personnel from the area. For example, treat a building when not in use. Minimising the number of workers during dipping. Delay grain unloading and entry into silos for a period following fumigation.
- (b) Limiting the time period of exposure for an employee.
- (c) Prohibiting eating, drinking and smoking when handling chemicals.
- (d) Providing and ensuring the use of adequate facilities for effective decontamination such as washing facilities.
- (e) Ensuring that outdoor tasks are done at the most appropriate time of day (eg wind drift or heat stress).
- (f) Correctly calculating crop volume, area to be treated and amount of spray required. This has the added benefit of minimising the amount used and costs.
- (g) Correctly calibrating equipment
- (h) Restricting crop re-entry after spraying (see section 8.6)
- (i) Signs indicating hazards.
- (j) Notification of neighbours.
- (k) Establishing procedures for disposal of waste and containers.

### **7.1.6 Personal Protective Equipment (PPE)**

PPE should only be relied upon where it is not possible to control exposure by one or more of the above measures. PPE should be used:

- according to instructions on the container label
- in an open field situation where engineering controls are not available
- when mixing, decanting or spraying
- in some circumstances as a back-up for other control measures.

Employers must provide PPE to workers free of charge.

## **7.2 Selection, use and maintenance of personal protective equipment**

Employers should ensure that:

- (a) PPE is appropriate for the task (see selection, below)
- (b) PPE is suitable for the wearer
- (c) PPE is readily available, clean and in fully operational condition.
- (d) Employees are trained in the use of the PPE, including the selection and maintenance (and where appropriate when to discard disposable PPE)
- (e) The employees wear the PPE as intended.

- (f) Any maintenance, such as cleaning, is carried out.
- (g) The likelihood of a secondary injury risk due to wearing PPE, such as skin rash or heat stress or dehydration caused by unsuitable clothing in hot conditions, has been assessed. A suitable control measure would be avoiding chemical use during the hottest part of the day.

### **7.2.1 Selection**

Check that the protective equipment you use has the appropriate Australian Standard number on the label. Various standards not only provide specifications but also indicate the type to be selected.

Use labels and MSDS (material safety data sheet) as a guide. If in doubt as to suitability ask the supplier for a recommendation for your intended purpose. Also check the supplier's specifications.

### **7.2.2 Eye protection**

Your eyes are the most vulnerable parts of your body to chemical or physical damage, and the most difficult to repair surgically. In any area where there is the possibility of flying objects or where chemicals might splash, you should wear appropriate eye protection. This could be in the form of safety glasses, goggles, a face shield, or full face respirator. Splashes are most likely when mixing, pouring and loading application equipment.

Select eye protection which conforms to AS 1337 *Eye Protection for Industrial Application*.

Australian Standard AS1336 *Recommended Practices for eye protection in the Industrial Environment* gives the requirements for the selection of the correct type of eye protection. If you wear ordinary spectacles it may be necessary to wear coverall safety glasses or a face shield over the top. Prescription eye wear is covered in AS 1336.

### **7.2.3 Gloves, aprons and other equipment**

Gloves should be always worn during cleaning operations to protect the skin from the corrosive effects of cleaning agents. Gloves may also be necessary when decanting or preparing chemicals. Check the MSDS for glove type. Also confirm with the glove supplier on suitability of the glove provided for the chemical used. Rubber gloves are usually not sufficient.

Select gloves which comply with Australian Standard AS 2161 *Protective Gloves and Mittens*.

### **7.2.4 Respiratory protection**

In some situations, respiratory protection will be necessary. An example is the use of pesticides, where the pesticide label specifies the use of a respirator or protective equipment. Sometimes the labels will use phrases such as avoid inhalation of spray, or vapour, or dust.

Select respirators which conform with Australian Standard AS 1716 *Respiratory Protective Devices*.

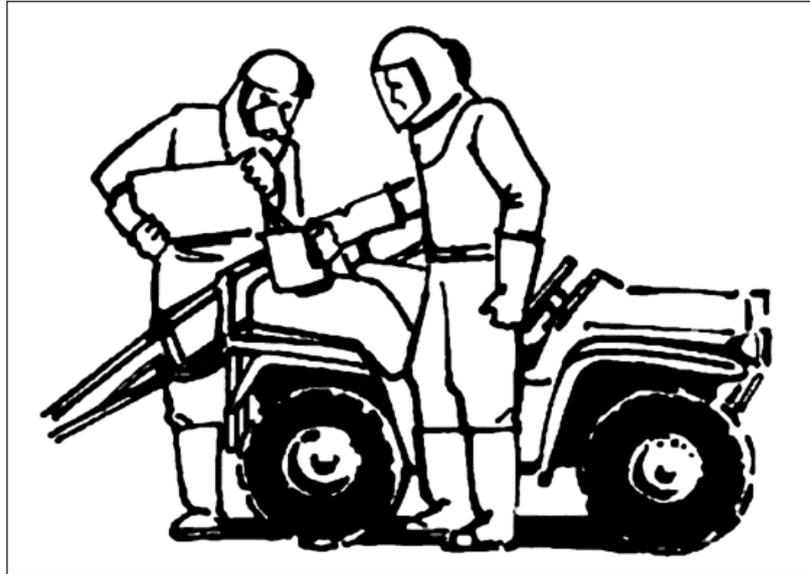
Respirators should be used, stored and maintained in accordance with the Australian Standard AS 1715 *Selection, Use and Maintenance of Respiratory Protective Equipment*. A respiratory program conforming with section 7 of AS 1715 would ensure maximum efficiency of the respirators.

Welding should be done with adequate cross flow ventilation and a respirator with P2 type particulate filters. Combined filters may be necessary depending on the type of flux, electrode, or filler material used. Consult MSDS for information.

### 7.2.5 Footwear

Footwear is an important safety item. Good soles provide you with a sound grip preventing accidents from slipping. Footwear can also protect your feet from mechanical or chemical damage. Gumboots are often practical when carrying out preparation or application where splashes are possible.

In some cases, safety footwear is necessary. Where impact, cuts or chemical spills are possible, select footwear which conforms to *AS 2210 Occupational Protective Footwear. Part 2 Specification* provides information on the suitability of footwear, sole designs and materials for different types of surfaces. Part 1 provides information on selection, care and use.



## 7.3 Recording control measures

As part of the risk assessment report, records should be maintained which confirm that exposure to hazardous substances and the storage and handling of dangerous goods is being controlled. These must be kept for at least five years, or 30 years if monitoring or health surveillance is required due to the long period before some health conditions become evident (see OHS Regulation clauses 168, 171 and 174X). If you cease business and the business records are not passed on to a new owner, then records of monitoring and health surveillance must be offered to WorkCover NSW.

### 7.3.1 Content of the record

The record should show the degree of the risk and how decisions were made concerning:

- the selection, design, construction or adoption of any control measure used
- the selection and use of any PPE
- the arrangements for training to ensure an appropriate application procedure is followed and the equipment is correctly used
- consider including suitable weather conditions in the assessment and restricting the chemical use if the weather is unfavourable.

### 7.3.2 Form of the record

On small properties, where the number of chemicals and persons is limited, a simple report attached to the original MSDS or written on the MSDS and dated would be sufficient (this must be kept for at least five years).

For example, if the MSDS for a chemical states:

- do not use in a confined space
- wear a respirator or avoid inhalation of vapours

In response note on the MSDS:

- Do not use indoors unless certain ventilation methods are used.
- Details of the respirator/canister selected, including manufacturers advice.

If you are using the Farmsafe documentation, you can combine the simple risk assessment with the form in Farmsafe Australia Part 3 – Register of Farm Chemicals.

For a large operation, where the same chemical may be used by groups of employees involved in different tasks and where there are many “work units”, the assessment record should include many of the items in the following list.

The range of topics on a complex assessment report include:

- (a) Description of work unit
- (b) Name of assessor or assessment team
- (c) Personnel involved in the assessment
- (d) Work area, date and time of assessment
- (e) A list of chemicals used in that work unit
- (f) Summary of the task(s) of the work unit
- (g) Risk identification including all risks to health and safety
- (h) Conclusions about the level of risk
- (i) Recommendations for control measures and training
- (j) Signature of assessor
- (k) Signature of employer.

In addition, the day to day use of control measures can be recorded on the same form used for recording chemical use. This will help you check that controls are being used. Controls can be recorded on the risk assessment record form (see Appendix 4).

An overview of all record keeping requirements is given in section 13.



## CHAPTER 8 – RECOMMENDED SPECIFIC CONTROL MEASURES

Use the advice in this section to check on your use of control measures.



### 8.1 Spray drift risks

To reduce risks from spray drift:

- Identify sensitive areas where spray drift is likely to have the greatest impact, such as water sources, occupied buildings, public roads, schools and other public amenities, livestock, crops and pasture.
- Separate the application site and the area of potential risk with a barrier, such as vegetation, or distance. For example, encourage vegetation growth to act as a barrier. Wherever possible, a buffer zone should be left between a sprayed and unsprayed area.
- Farmers should prepare property plans as a means of communicating to others all the factors that need to be considered when applying chemicals on a property. The plan should identify houses and farm buildings, neighbouring properties, sensitive areas, roads and access points, public roads and public places, watercourses and storages, paddock boundaries, and powerlines and aerial hazards such as transmitter towers. The property plan is both a tool for communicating with neighbours and a management tool when spraying contractors are used or employees given directions.
- Farmers should communicate with neighbours to minimise drift problems and to avoid conflict. Communication could include: pre-season discussion with neighbours to identify farming activities involving chemical application, chemicals used and potential interactions with neighbours, notification of neighbours prior to application, and agreement on conditions under which application will not proceed or will be abandoned.
- Use a formulation or product (if available) which reduces spray drift, or alternative application method (if permitted by the label). Some formulations are more volatile than others. Low volatility formulations are preferable in areas where exposure to others nearby is possible, or where elevated temperatures may occur after spraying. Dust can ionise and suspend on a dry day, creating drift.
- Check wind speed and direction (see also section 8.3 below). Spraying should only take place when the breeze is blowing away from an area that may be at risk from drift.

- Choose equipment that is designed to reduce or eliminate drift (if permitted by the label instructions). Equipment should be used according to the manufacturer's instructions and be the most appropriate for the task in hand, for the particular pesticide and target requirements.

For each type of application equipment, variables such as nozzle type, hydraulic pressure, height of delivery and the presence or absence of a directed airstream will affect the size and movement of droplets produced, and the efficiency with which they impact on the target. Application equipment needs to be set up to maximise pest control efficiency and to minimise spray drift.

Spray volume should be controlled by changing nozzles and not by varying pressure. A higher pressure generally forms a finer spray that may drift excessively.

Droplet drift before the pesticide hits the target is reduced if the release height is as low as possible. However, if the release height is too low it may be difficult to obtain a uniform spray pattern.

Non-drip valves and recirculating systems should be used where possible. Pressure gauges should be maintained and functional. Ensure that the spray rig is calibrated accurately and frequently.

Calibration and maintenance should be undertaken regularly and include checks of nozzle performance and wear, pressure, the accurate working of gauges and regulators, spray output, filters, and the speed of ground rigs.

## **8.2 Weather conditions**

To minimise spray drift it is necessary to monitor weather conditions during and immediately after application. Without access to real time weather information in the vicinity of the target crop, aerial and ground based spraying should not be undertaken.

Ideally, relative humidity should be high and temperature not greater than recommended for the product.

- *Temperature* affects the rate of evaporation, particularly water based sprays. Evaporation can reduce the size of droplets making them more drift prone. ULV formulations, which rely on light oil as a carrier, are less prone to evaporation.
- High *relative humidity* is preferable to minimise drift that can occur through evaporation. Applications at temperatures above 30°C and at relative humidities below 45 per cent increase the risk of drift.

Ensure that spraying is done in cross-wind conditions rather than directly into or with the breeze.

Application should be avoided in calm, stable conditions which may occur early in the morning, late in the afternoon or during a temperature inversion.

Technologically superior spraying equipment, such as a rain drop nozzle, may allow spraying to occur in a wider range of weather conditions without creating a drift hazard.

### **8.2.1 Rain**

Rain may cause run-off of the pesticide with a risk of environmental contamination. This should be taken into account when assessing risk to the environment. Pesticides must not be applied if rain is likely to wash the pesticides from the site of application.

### **8.2.2 Inversion**

Do not spray under conditions of atmospheric temperature inversion, where air closer to the ground cools faster than the air above it, and forms a layer where air temperature increases with altitude instead of decreasing. Small spray droplets released into an inversion layer can remain suspended and drift long distances. Inversion conditions are most likely in the early morning and late afternoon in the absence of wind, and are often marked by fog, smog or smoke drifting at a constant height instead of rising.

### **8.2.3 Aerial application**

Aerial application, and droplet capture by the target crop, are improved where cross winds create turbulence in the crop. Cross winds of between 3 to 10 kph are preferable for aerial application to broad acre crops. In the case of bare earth or fallow, lower cross wind speeds are preferable. No application should occur at speeds above 15 kph unless specific drift minimisation strategies are in place. Variable low speed winds should also be avoided.

If conditions are not suitable to minimise potential risks from drift, the spray operation should be delayed until conditions are suitable.

## **8.3 Minimising chemical waste and disposal**

Some pesticides are no longer registered and restrictions may exist for disposal of such pesticides – for details on the deregistered organochlorine pesticides see appendix 8.

You must never dispose of pesticide wastes or rinsates down drains, sinks, toilets, gully traps or into bodies of water.

### **8.3.1 Minimising disposal**

Minimisation of use is an important consideration for minimising the potential environmental and health harm. Consider eliminating chemical use (see the hierarchy of control in section 8).

- (a) Choose the least persistent product available for the application.
- (b) Purchase pesticides in reusable or returnable containers if possible. Otherwise try and obtain recyclable containers.
- (c) Cooperate with other commercial users to minimise the amount purchased.
- (d) Minimise the number of articles (such as measuring containers, funnels and stirrers) used in preparation and application.
- (e) Add rinsates to the tank of pesticide to be used.

### **8.3.2 Surplus chemicals**

The options in descending order of preference are:

1. Return unopened containers to the supplier or manufacturer.
2. Use the chemical for its intended purpose.
3. If the container is sound and the label intact, offer surplus chemicals to another commercial operator who needs them for an approved use.
4. Arrange for collection by a waste contractor (listed in the Yellow Pages under “Waste reduction and disposal services”). If using a disposal contractor ensure that the contractor is licensed to handle the chemical to be removed.

5. Label and store securely, pending one of the above actions

### 8.3.3 Burial of wastes on your property

If other disposal options are not available or practicable, and if burial will not result in human or environmental risk, then when disposing of a chemical on your property, note the following:

- the label advice on disposal should be followed
- only pesticides and chemicals that biodegrade or hydrolyse can be disposed of by burial
- only diluted pesticide (use rate), spray tank waste or other rinsate waste can be buried
- waste water should be first diluted and then disposed in a pit drain at least 1 metre below the surface, well away from water courses, ground water discharge areas, areas of high water table or highly permeable soils.
- coverage should be at least 500 mm of soil
- the pit drain should be constructed along the contour of the land surface and be of sufficient length to accommodate the waste water
- the pit drain should be backfilled and a different site chosen for future waste water disposal.

The disposal site should be:

- sited to avoid seepage and run off which may contaminate other areas, and be remote, flood free, clearly marked and fenced
- in an area where there is no danger of contaminating dwellings, underground water, surface water, crops or livestock
- level, with a suitable plastic liner and have hydrated lime spread across the bottom
- suitably identified for a future owner or user of the property.

Some pesticides are not completely bio-degradable and as a result some contamination of the land may occur. Under contaminated land legislation, future sale and subsequent use of the land may be affected.



The disposal of waste from aircraft and pad washdown after aerial spraying is covered by a Department of

Environment and Conservation guideline: *Draft Environmental Guidelines for Aerial Spraying Facilities*.

If you store more than 500kg of hazardous waste, or generate more than 2 tonnes per year then you must be licensed under the *Waste Avoidance and Resource Recovery Act 2001*.

Further information can be obtained from the Department of Environment and Conservation's pesticide inspectors (telephone 131 555 for details).

## **8.4 Disposal of empty containers**

Empty containers must be rinsed and disposed of, or re-cycled in the manner suggested on the label. If manually rinsed, they should be triple rinsed.

Disposal of drums becomes a lesser environmental issue if they are rinsed correctly.

### **8.4.1 Triple rinsing**

An effective manual rinsing procedure is:

1. On emptying the contents into the spray tank, drain the container for an extra 30 seconds after the flow has reduced to drops.
2. Fill the container with suitable solvent to about 20 per cent to 25 per cent of its capacity.
3. Replace the cap securely.
4. Shake, rotate, roll and/or invert the container to wash all of the inside with rinse.
5. Remove the cap and add rinsate from the container to the spray tank. Drain the contents for an extra 30 seconds after the flow has reduced to drops.
6. Repeat steps 1 to 5 two more times.
7. Check the container thread, cap and thread, and outside surfaces, and if contaminated, rinse with a hose or hand wash.
8. Let the container dry completely and replace the cap.

Various rinsing attachments and transfer systems which have flush and rinse cycles are available.

Containers should be returned to the supplier when they are marked 'returnable', or the label specifies return to point of sale. Where rinsed containers are stored ensure that lids or bungs are removed to prevent re-use and that containers are secure. If not returned to the supplier it may be appropriate to puncture or crush the container to ensure that it cannot be used again. Steel containers should be punctured using a rod or steel crowbar, by passing it through the neck or pouring opening and out the base of the container.

Containers should not be burned. Explosions may occur and the smoke and fire products are a risk to health.

The decision on whether a landfill will accept a properly cleaned pesticide container rests with the landfill operator. Holders of such waste should discuss the disposal of these items with their local government authority.

For further information consult industry leaflets such as the AVCARE publication *Disposal of Farm Chemicals and Containers on the Farm*. Empty containers should be managed in accordance with the Department of Environment and Conservation publication *Environmental Guidelines – Assessment, Classification and Management of Non-liquid Wastes*. See also the web site: [www.drummuster.com.au](http://www.drummuster.com.au)

## **8.5 Re-entry periods**

### **8.5.1 Crops**

The re-entry period is the period in which a treated field must not be re-entered by unprotected persons after the application of a chemical on a crop. This should be considered as part of the risk assessment. Workers and others should be advised of the correct time-lapse. It is important to observe the re-entry period where contact between foliage and skin is unavoidable.

Look to see if the re-entry period is on the label.

Where no re-entry period is stated, a minimum of 24 hours should be observed or until the chemical has dried upon the crop, whichever is the latter (subject to the risk assessment), unless appropriate PPE is provided and worn as intended. Caution should be exercised entering wet crops where chemicals have previously been applied, irrespective of the time lapse between application and re-entry.

Even after the re-entry period has been observed, some PPE may be necessary. Appropriate PPE should be indicated by the risk assessment.

### **8.5.2 Silos**

Administrative controls should be adopted to restrict entry into silos following fumigation, to allow time for the dispersal of fumigants prior to unloading or to entry into the container. Engineering controls include forced ventilation.

## **8.6 Handling produce and the use of mechanical equipment – residues**

Exposure to residues may occur in the following situations:

- persons entering crops or pastures if some skin contact with residue or other exposure is possible (eg consultants who inspect crops or insects, weed chippers, pruners, vine trainers, fruit pickers)
- handling or packing dipped or treated produce, cut flowers or livestock, picking fruit, moving nursery plants, shearing – observe any label or permit conditions for post-harvest treatment
- dusts containing hazardous residues are produced during mechanical harvesting or bulk transfer
- fumigants are emitted during transfer from bulk silos.

Evaluate the need for suitable PPE, such as gloves and respirators, in such situations.

## **8.7 Control of risks to other people at or near the workplace**

The protection of other people is an important objective and the following should be observed:

- do not allow others, including children, in the vicinity of the areas where pesticides are being sprayed or mixed
- provide copies of MSDS to other people working at the workplace, if requested
- keep pesticides away from children and keep vehicle carrying chemicals locked or supervised at all times
- after the application of pesticides, make sure that residues are not left on surfaces or suspended in the air so that other persons will not come into contact with pesticide residues
- do not allow spray drift risks.

Notify neighbours prior to the commencement of spraying if there is a risk of spray drift. This advice should include the following:

- type of pesticide to be sprayed
- time of spraying
- area to be sprayed
- re-entry period
- hazards and risks associated with the chemicals to be used.

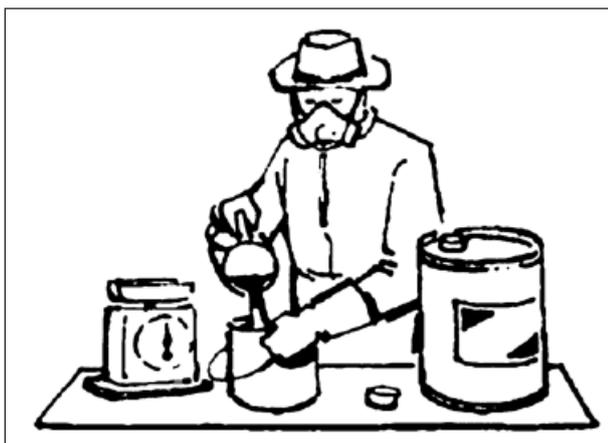
## **8.8 Checking controls and assessment of personal exposure**

Check that procedures follow the label and MSDS recommendations. Use the following points as a checklist.

### **8.8.1 Preparing, mixing and handling concentrates**

Great care should be taken when handling concentrates and powders, as this is the time of greatest risk. Observe the following precautions:

- (a) Wear appropriate protective clothing and equipment and have an adequate supply of filters for the respirator.
- (b) Handling powders or concentrates and mixing should be done in a well ventilated area. Stand up-wind while opening, pouring and mixing.
- (c) Do not eat, drink or smoke while preparing and mixing pesticides.
- (d) Avoid contact with the skin, eyes or mouth. If contamination occurs, wash the affected area immediately with copious amounts of water (if indicated by the label).
- (e) Avoid leftover prepared spray by effective calculation of the amount to be used and accurate calibration of equipment.
- (f) The measuring and mixing process is the best time to wash empty pesticide containers. All pesticide containers should be triple-rinsed (see section 8.4). The water used to rinse the container should be added to the spray tank during mixing.
- (g) Spills should be cleaned up immediately.
- (h) Prepare pesticides in the application tank, or on a drip tray over an impervious surface, at least 15 metres from any waterway.
- (i) If the chemical is flammable, decant and prepare away from any possible ignition sources or heat sources.



### 8.8.2 Using pesticides

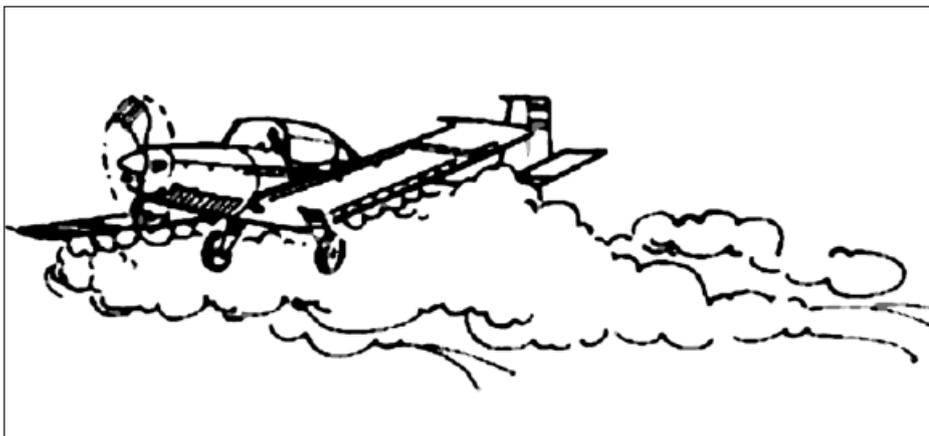
- (a) Avoid inhalation of pesticide vapours or dust.
- (b) Avoid skin contact. If contact occurs, wash with copious amounts of water (check safety directions on label).
- (c) Do not eat, drink or smoke.
- (d) Manage spray drift by carefully assessing wind direction and strength. Never spray in high winds, assess for weather conditions, and stop spraying if weather conditions deteriorate (see section 8.3).
- (e) Avoid, as far as practicable, pesticide run-off to ensure that adjacent properties, persons, flora, fauna and waterways are not affected.
- (f) Take steps to ensure the safety of occupants or users of treated facilities, buildings or areas (eg glass houses, grain storage areas).
- (g) If you feel ill, or start developing symptoms, stop work and seek medical attention.
- (h) Do not use your mouth to blow or suck pipes or nozzles to clear them.

### 8.8.3 Human markers for aerial spraying

Marking means providing visual signals on the ground in connection with spraying from aeroplanes or other means. The use of human markers is discouraged. As alternatives, consider the use of electronic swath markers which increase accuracy and can provide a record of where spray was released, mechanical signals or GPS systems. This can be specified in the contract with the aerial sprayer.

Markers have a high potential for exposure to pesticides. Employers and persons in control of workplaces should make arrangements so that:

- Aircraft never pass and spray over markers.
- Markers move up-wind to the next mark before the aeroplane is within 300 metres of them.
- Markers wear the correct protective clothing and equipment, or use vehicle with a carbon filter fitted to air-conditioning.
- Contact with any freshly sprayed area is avoided (see section 8.5).
- Markers have a 20 litre container of clean water for washing available in a convenient location.
- If spray or spray drift contacts clothing, markers stop work immediately, remove contaminated clothing and wash the parts of their body which have been contaminated.
- When marking is finished, work clothing is removed and the marker should wash thoroughly with water and soap.



#### **8.8.4 Clothing and equipment**

Use of the following items should be considered:

- (a) Cotton overalls buttoned to the neck and wrist.
- (b) Chemical resistant water-proof aprons when mixing or pouring concentrate.
- (c) Gloves (chemical resistant), preferably gauntlets, to be worn when handling or using chemicals.
- (d) A wide brim washable hat. If contaminated the hat should be removed immediately and washed before re-use.
- (e) Boots such as rubber or PVC. Waterproof leggings provide additional protection. Leather boots can absorb pesticide and cause exposure during high volume applications.
- (f) A face shield or splash proof goggles when mixing or pouring. When spraying consider non-ventilated goggles.
- (g) An appropriate respirator, especially if exposure to spray drift is likely.

#### **8.8.5 Washing and equipment clean-up**

Regular cleaning and maintenance avoids the build up of residues in and on equipment.

After each application:

- (a) Remove any remaining pesticide mix from the tank. The tank should be partially filled with clean water and rinsed.
- (b) PPE should be worn during cleaning. It should also be cleaned after use.
- (c) The suction filter, and in-line filters on boom sprays, should be removed and washed, spray lines flushed and nozzles and nozzle filters washed.
- (d) Pesticide washed from the tank should be stored in a labelled container for reuse, or sprayed over the area just treated.
- (e) Flush out and hose down equipment and machinery used for spraying.
- (f) Water used for hosing down should be collected in a sump or soakaway pit.
- (g) Return pesticide containers to the store or safely dispose of empty containers after triple rinsing them.
- (h) Remove and wash protective clothing and equipment.
- (i) Wash or shower thoroughly with water and soap. Employers should provide adequate washing amenities including water, soap and towel.
- (j) Change clothes, store and wash work clothes separately from other laundry.
- (k) Vehicles and equipment used to apply pesticides must be washed at least 15 metres from any waterway.
- (l) Washdown water must not flow or percolate into any waterway or area of high water table.

Advice on clean up and disposal of residue for aircraft and aircraft pads is provided in the *Environmental Guidelines for Aerial Spraying* produced by the NSW Department of Environment and Conservation.



#### 8.8.6 Use and maintenance of respirators

- (a) Ensure that the correct type of filter is used. Check the expiry date on the pack.
- (b) Filters should be renewed regularly – consult the manufacturer or supplier for use times. A maximum of eight hours of actual use is recommended. However if the odour or taste of the pesticide is noticed, the filters should be changed immediately.
- (c) The respirator should be tested for a good comfortable seal on the face by following these procedures:
  - (i) Place the hands over the filter(s) and inhale. In the case of a good seal, the face-piece will collapse inwardly, and no leak can be heard.
  - (ii) If air enters, tighten the fit by adjusting the headband.

Note: A proper fit cannot be achieved if the person has a beard or facial hair where the seal should touch the face.
- (d) Face-pieces are available in different shapes and sizes, it is important to ensure the type used provides a satisfactory seal.
- (e) Ensure that the face-piece, valves, filters and hoses are in good condition and well maintained.
- (f) Do not expose the inside of the respirator to any pesticide during use or storage.
- (g) After use, remove filter(s) and wash the face-piece using warm water and soap.
- (h) Many respirator filters absorb other fumes and chemicals in the air even when they are not being worn. This will shorten the use life of the filter. Keep the filter in an air tight container while you are not using it.
- (i) The respirator and filter(s) should be placed in a sealed plastic bag and stored in a clean dry place, away from the pesticide storage area.
- (j) Each pesticide user should have their own face-piece. Respirators should not be shared, borrowed or lent without proper sterilisation.

## CHAPTER 9 – TRAINING

Employers must provide appropriate induction and on-going training for employees (OHS Regulation clause 13). The training must be commensurate with any risk to health or safety, and provided in an appropriate manner. Records of training must be kept (OHS Regulation clauses 171(1)(b) and 174ZV).

Also, under the *Pesticides Act 1999*, employers may be liable for any breaches of that Act, where the breach resulted from the activity of employees.

Training in the use of chemicals covered in this code can be obtained by completing an accredited course such as the Farm Chemical End User Training Course (also known as the Farmcare course or ChemCert). The Managing Farm Safety Course may also be helpful. For aerial spraying the Aerial Agricultural Association has the Spray Safe Accreditation program.

However, additional on the job training may be required for those who are likely to be exposed to hazardous substances or who handle or store dangerous goods, under the particular circumstances and equipment used in your workplace, as outlined below.

### 9.1 Provision of training by employers

The detail and the extent of a training program will depend on the hazards associated with the chemicals that are used and the work procedures carried out by each employee. This should be considered when doing the risk assessment.

Suitable training on the use and application of chemicals covered in this code can be obtained by completing an accredited course such as the Farm Chemical End User Training Course. Consider the appropriate content for induction training for new employees including casual employees, or when an employee is assigned to a new task or work area.

Training can be formal or on-the-job. It should take into account literacy levels, work experience and specific skills required for the job. It should be practical and hands-on where this is relevant. For example, hands-on training should be used for the use and fitting of PPE.

The following must have appropriate training:

- workers who are required to store or use a chemical
- workers who are supervising others working with a chemical
- those who are required to work in close proximity to where chemicals are stored and used, or who may come into contact with hazardous residue
- everyone likely to be involved in fire or emergency action
- casual or seasonal workers who may use or come into contact with a chemical or residue – consider limiting the tasks performed by casual or seasonal workers as an alternative to providing a greater degree of training.

### 9.2 Training about the requirements of legislation

A training program should cover all of the following:

- duties under the OHS Act and OHS Regulation
- applying this Code of practice
- advice regarding the specific hazardous substances or dangerous goods that may be stored or used in the workplace

- the legal significance of a label and any restrictions resulting from it
- any other relevant legislation or guidance material relating to the transport, use, storage and disposal of chemicals.

### **9.3 Information on a substance**

Where relevant, training should also cover:

- Recognising and interpreting the information on a label including:
  - safety directions and risk phrases
  - poison scheduling, dangerous goods and hazardous substances classifications and symbols
  - first aid and emergency procedures, and special directions
  - application rates, compatibility and withholding periods for pesticides.
- The importance of being able to:
  - know the parts of the label and the significance of the information in each part
  - extract and interpret information from a product label
  - relate the hazard to the poison schedule, dangerous goods classification and risk phrases
  - calculate the amount of pesticide to use to give the correct application rate.
- How to obtain access to the MSDS, and the information each part of the MSDS can provide.
- The selection, use, maintenance and storage of safety equipment required.
- Any work practice or procedure to be followed in any aspect of the use of a chemical in the workplace, including any appropriate Australian Standard, Code of practice or national Code to be followed.
- Re-entry periods.

### **9.4 Personal safety**

Where relevant, training should also cover:

- the routes of entry into the body of chemicals
- the risks posed by chemicals commonly used in the particular industry
- the precautions to be taken for a particular task, including the use of machinery
- the risk assessment process
- control measures and maintenance
- the correct selection, use, fit and maintenance of protective equipment and clothing, including respirators and filters
- exposure controls when working in a truck or tractor cabin
- air monitoring (where indicated by the risk assessment)
- health surveillance (where indicated by the risk assessment)
- first aid and incident reporting procedures
- confined spaces, where applicable, for example, cleaning inside a vat or silo.

## **9.5 Application of chemicals and environmental safety**

Training should also cover the application of chemicals including:

- selection of appropriate equipment
- importance of accurate and even application
- nozzle selection
- calibration for efficient application and reduction of spray drift
- calculation of the amount of pesticide to give the desired application rate
- decontamination steps for equipment and clothing
- disposal of waste
- maintenance and cleaning of equipment
- protection of others at the workplace.

## **9.6 Record keeping**

Training should also cover the preparation and appropriate use of a pesticide application record sheet, and storage records.

## **9.7 Emergency procedures**

Training should also cover:

- protection of human life
- potential for environmental damage
- initial measures to establish control
- decontamination
- first aid or incident reporting procedures where injury or illness to other persons has occurred.

## **9.8 Review of training**

Review the training program or credentials of employees, when there is a change in the following:

- any hazard information available
- the risk assessment
- a work practice
- a control measure.

## **9.9 Records of training**

The training program record should include:

- the names of persons providing and receiving training and date of attendance
- an outline of the course content
- where applicable, details of any courses they have attended (eg TAFE courses or end user courses and certificate numbers).

A suitable form is provided in the Farmsafe Australia Managing Farm Safety Program, *Part 4 – Register of Training of Farm Workers*.

Training records must be kept for five years (OHS Regulation clauses 171 and 174ZV).



## CHAPTER 10 – STORAGE AND TRANSPORT RISKS

The purpose of this chapter is to reduce emergencies relating to storage risks, such as:

- fires
- leakage
- spills
- accidental exposure.

Accidents and spillage risks arise when:

- opening containers
- handling or mixing chemicals
- gases leak from containers or connections (eg when opening or closing valves)
- maintenance is carried out.

For advice on dealing with spills see section 12.1.

The exposure or physical risks to any person close to the incident may be high. Environmental risks from escaping chemicals may also be considerable. These risks can be controlled by reducing the likelihood of an incident occurring, and establishing emergency procedures to reduce its severity should it occur.

Some chemicals are classified as dangerous goods and above a certain quantity specific Australian Standards should be observed (see also chapter 11).

The general principles of this chapter should be applied to all types of chemicals, not just dangerous goods.

### 10.1 Transport in vehicles

#### 10.1.1 Following purchase – unopened containers

When obtaining chemicals from a supplier in the original unopened containers, observe the following:

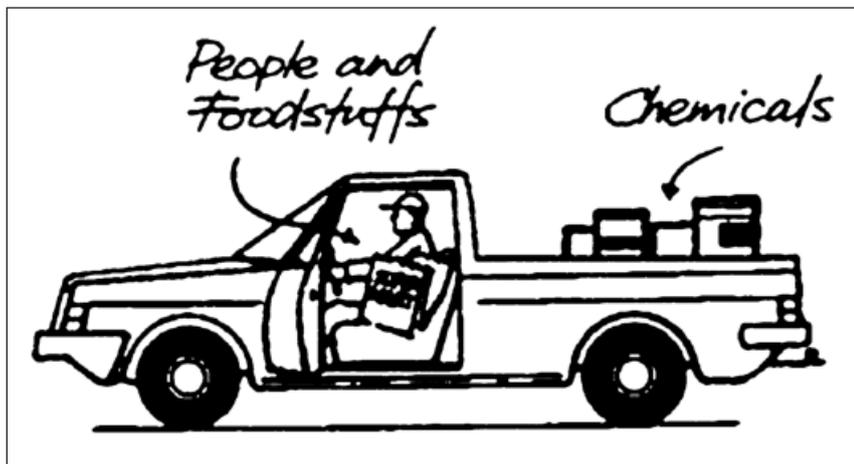
- keep them in a compartment of the vehicle separate from persons or foodstuffs
- if parked on a public road, the vehicle should be kept locked to prevent public access to chemicals – do not leave your loaded vehicle unlocked or unattended
- protect the load from the weather
- do not accept or load damaged or leaking containers. Secure the load and limit its movement.



### 10.1.2 Transporting chemicals in opened containers

When transporting chemicals once the container has been opened for use observe the following precautions:

- keep in a separate airtight compartment, or on the rear section of an open vehicle
- personal protective equipment, a change of clothes, food and drink, should be carried in clean containers preventing contact with any chemical – a change of clothes may be necessary if clothing could become contaminated by chemical use
- pest control equipment and chemicals carried on the vehicle should not be in contact with porous surfaces
- the internal and external surfaces of the vehicle, chemical containers and spray equipment should be kept free of chemical contamination
- protect the load from the weather
- do not leave your loaded vehicle unlocked or unattended
- do not load damaged or leaking containers
- secure the load and limit its movement.



### 10.2 Australian Code for the transport of dangerous goods (ADG code)

The specific requirements of the ADG Code for the transport of dangerous goods do not usually apply to the transport of chemicals on a farm.

Large operations should check the amounts for which marking of the vehicle and other special conditions are required by the ADG code.

Pesticides that are classified as dangerous goods of classes 2.3, 6 or 3, are covered by special conditions when transporting more than the following:

- 250kg or L of class 2.3 or class 3 or 6 in Packing Group (PG) I
- 1000 kg or L of class 3 or 6 in PG II or III.

Above these limits you will need special advice on the marking of vehicles and other matters. Consult the ADG Code or the Department of Environment and Conservation.

### 10.3 Storage risks

The key hazards and risks are indicated by the dangerous goods classification on the label of the container – however the general advice in this chapter should be followed for all chemicals.

When assessing risk for stored chemicals, consider the following:

- the quantity of chemical to be stored and the type of containers (ie in packages or in bulk)
- the duration of storage
- the dangerous goods class, Packing Group and other characteristics of the chemicals with respect to toxicity, stability and compatibility (see the MSDS or supplier)
- the separation of chemicals from other classes of dangerous goods. For example, Class 5 oxidising agents, such as solid pool chlorine, are incompatible with many other substances
- spillage control (for liquids)
- fire rating of the structure and walls
- ventilation
- emergency procedures and equipment needed in the store (consult the MSDS for information on fires and other emergencies)
- the need for control of potential ignition and heat sources
- separation from other stores of chemicals, fuels or combustible materials
- separation distances from other activities and accommodation.

Separation distances, the isolation of spills and suitable emergency procedures are important control measures even when small quantities of chemicals are stored for short periods.

### 10.4 Storage quantities

Even small amounts of highly toxic chemicals in packages, such as dangerous goods in Packing group I (eg carbon disulphide), should be stored in a metal cabinet.

Relatively small amounts of PG II or III should be kept on impervious spill trays on shelves.



Some veterinary chemicals should be kept in a refrigerator, separated from food.

You should use a designated storage area for chemicals if storing more than 100 kg or L. This may be a cabinet, part of an existing store or a purpose-built store.

Reducing the quantity of chemicals stored is one of the most cost effective ways of reducing the risk. Many chemicals have a specified shelf life and do not retain their efficiency beyond that date. Minimising purchasing not only saves purchasing costs but also minimises disposal costs.

**Step 1** – Check the factors to consider.

If a dangerous good of Packing Group I in packages then keep in a metal cabinet or other purpose built store. Otherwise go to step 2.

**Step 2** – How much to be stored?

If over 100 kg or litres in packages then consider either a:

- \* cabinet, or
- \* segregated area, or
- \* purpose built store.

**Step 3** – If over 1,000 kg or litres then check if you need to notify WorkCover of the dangerous goods, or if other specific Australian Standards apply (see Chapter 11).

**Step 4** – Consider location and design of the storage area.

## 10.5 Storage design (solids or liquids)

When storing chemicals, consider using a secure separate building, or a segregated area within a building, with the following features:

- cross flow ventilation
- concrete floors with drainage into a sump
- concrete door sills
- concrete block or concrete walls to a suitable height to provide a bund
- impervious shelving or spill control trays on shelving
- a lockable door to keep dangerous goods secure, or child-proof latch if no dangerous goods are stored
- a clean up kit for spills
- access to water for washing and cleaning.

Provision must be made for the containment of spills of those chemicals classified as dangerous goods (OHS Regulation clause 174Y). This is also good practice for those chemicals not classified as dangerous goods.

The walls (or bund) and door sill should be high enough to contain a spillage of 25 per cent of the total volume of packaged liquid chemicals, including at least 100 per cent of the largest package.

All above-ground bulk tanks must have a form of spillage control (also called bunding). Bunding for bulk tanks under a roof must contain 100 per cent of the largest tank, or 110 per cent for outside tanks (to allow for possible rain water accumulation). A bulk tank includes a bulk transport container such as an IBC (Intermediate Bulk Container).

Provide for drainage of spills and clean up water into a sump or pit that can contain the chemical, clean up materials and the wash water. A supply of wash water should be readily available.

Good natural cross-flow ventilation should be provided with vents in opposite walls, above bund height. Substances should be stored at a cool temperature to prevent deterioration. The products should be protected from moisture so that Packing and labelling does not deteriorate (especially cardboard containers).

Check the MSDS for information on chemical compatibilities and other advice in relation to storage. In some cases, specific Australian Standards provide advice on the location, design and separation distances of the store.

If you store relatively large quantities of chemicals (eg more than one tonne or more than 1,000 L of any type) then a specific Australian Standard may need to be observed.

Australian Standard AS 2507 *The storage and handling of agricultural and veterinary chemicals* should be observed if you have more than 1,000 kg or 1,000 L of agricultural chemicals that are dangerous goods.

In some cases where a wider variety of packaged dangerous goods are used (eg where produce is processed such as wineries or oil extraction) AS/NZS 3833 *The storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers* may be applicable.

The above standards are approved industry codes of practice.

For some applications, Class specific standards should be observed – see chapter 11.

## 10.6 Gases

Gas cylinders should be kept:

- secured in an upright position (except for cylinders mounted on vehicles)
- in a well ventilated area, open on at least two sides
- secure from unauthorised access (eg use a steel grid or wire mesh fence).

For gas tanks, the relevant Australian Standard should be observed (see chapter 11).

## 10.7 Location, security and access to storage

When siting a storage area consider the following:

- (a) Locating the store or storage area separate from other buildings, dwellings, storage of foodstuffs or workplaces.
- (b) Preventing accidental or unauthorised access to the storage area, such as keeping the store locked (dangerous goods must be kept secure) or fitting a child proof latch.
- (c) The risks to children and visitors to the workplace who are not familiar with the hazards of chemicals.
- (d) The risks of dangerous goods indicated by the Class and Packing Group of the chemical stored, and any separation distances required from other activities or stores (including outdoor bulk tanks, bags and drums of dangerous goods).
- (e) The likelihood of flooding. Flood prone areas and potential water courses should be avoided. The likely destination of any water and residues from fire fighting should also be considered.

## 10.8 Chemicals in packages

Chemicals should be stored in their original packages. However, if the package is damaged or leaking, transfer the contents into another correctly labelled package (see also section 5.4). Soft drink bottles or food containers must never be used for storing chemicals.

Ensure that all original labels remain legible and on the package. Lighting should be adequate to enable labels to be read. The recommended level is 200 lux.

Containers should be regularly checked. Containers that are leaking or corroded should be secured by placing in another container, such as an 'over-drum', or removed. Always use old stock first.

Keep containers closed or the lids on while in storage. This helps to reduce dust and/or solvent vapours building up in the storage area. Do not store liquids above solids.

## 10.9 Storage of packages

Apply the following conditions regardless of the amounts stored:

- (a) The storage of flammable or combustible goods must not be near heating or ignition sources such as a stove, heating appliance, light switches, welders, or similar ignition sources.
- (b) Packages should be kept closed when not in use. Opening a package of flammable liquid or decanting (pouring) from it should be carried out in a well ventilated area, away from potential ignition sources and away from combustible material or residues.
- (c) Flammable liquids must be moved from storage to the point of use in a manner that minimises the possibility of spillage or fire.
- (d) Flammable and combustible liquids must not be stored or used where they may jeopardise escape from a building in the event of fire.
- (e) Persons who handle flammable and combustible liquids must be trained in the hazards involved.
- (f) Any spillage must be cleaned up immediately and the materials used in the clean-up must be disposed of properly.
- (g) Any materials which may interact dangerously if mixed, such as pool chlorine or ammonium nitrate fertiliser, must be kept apart to minimise the possibility of interaction.
- (h) Packages must not be pressurised to transfer contents, unless they have been specifically designed for this.
- (i) Packages should be stored on shelves or in cupboards. To reduce the risk of breakage and spillage, all packages should be stored not higher than 2 m above floor level. Do not keep liquids above solids.
- (j) Flammable liquid signs for the storage area are recommended.
- (k) Carbon disulphide is particularly dangerous and must be kept away from any heat source or ignition source, since it is readily flammable and combustible.

## 10.10 Emergency procedures

To assist with establishing emergency plans and procedures refer to labels and MSDS for information about the following:

- emergency equipment such as the correct fire extinguishers
- training for emergencies

- clean up procedures
- flammability
- first aid kit.

The contact number for the *Poisons Information Centre* should be displayed at the telephone nearest to the store, so that prompt advice can be obtained if someone is poisoned.

If the amount of dangerous goods stored exceeds a certain quantity then a written emergency plan is required – see more advice on dangerous goods in the next chapter (chapter 11).

### 10.11 After assessing storage facilities

Following the assessment of the risks of storage of chemicals:

- take steps to remedy any high risk areas and situations as soon as possible
- notify Workcover of the dangerous goods and/or observe standards if necessary (see chapter 11)
- establish emergency procedures or review existing procedures
- improve the quality of storage areas where reasonably practicable
- make plans for the construction of future storage areas if necessary to reduce risks.

Specific requirements for dangerous goods are covered in section 11.

### 10.12 Storage assessment record content

In a storage assessment record note down how all the factors in this section have been addressed. A single site assessment record should be adequate in most workplaces or storage sites. An example record form and checklist is in appendix 1. This form is an example only and should be tailored to meet the specific needs of your business.



# CHAPTER 11 – DANGEROUS GOODS – PLACARDS, NOTIFICATION AND STORAGE

The advice in this chapter covers examples typically found in agriculture. If you have other types of dangerous goods, or any dangerous goods in Packing Group I, consult the *Code of practice for the storage and handling of dangerous goods* for advice on appropriate storage.

## 11.1 Regulatory requirements

An appropriate level of fire protection is required for all areas where dangerous goods are stored or handled (OHS Regulation clause 174ZB).

There are additional legal requirements if you keep dangerous goods over certain quantities on your agricultural property, as follows:

- a placard on the storage area – see the “Placard quantities” in the table in section 11.2 below (OHS Regulation clauses 174ZJ and 174ZK)
- a “manifest” and written emergency plan – see the “Manifest quantities” in the table in section 11.2 (OHS Regulation clauses 174ZN and 174ZC)
- notification to WorkCover NSW above the “manifest quantity” (OHS Regulation clause 174ZS)
- licences and permits are required for explosives (both storage and use) under the *Explosives Act 2003* and the *Explosives Regulation 2005* – see section 11.3.

## 11.2 Placards and notification

### 11.2.1 Quantities where placards and notification required

Over certain quantities of dangerous goods WorkCover must be notified (OHS Regulation clause 174ZS). This was formerly called licensing under the now repealed *Dangerous Goods Act 1975*, but the quantities have changed. This depends on the Class and either the Packing Group, or sub Class for gases. You need to check this when you form the Register (see section 13.2.1).

In the following table, the capacities in litres are capacities of the container of the dangerous goods, including the “water” capacity of cylinders or tanks of gas. These quantities include those in use (not just the goods stored). The full listing is in schedule 5 of the OHS Regulation.

**Examples of quantities above which placards,  
manifests and notification are required**

<b>Class or type</b>	<b>Placard quantity</b>	<b>Manifest and notification quantity</b>
Any class in bulk, Diesel fuel in bulk.	Any quantity in bulk – above 400 kg, 450 L, of a solid or liquid or 500 L of a gas (including a liquefied gas)	See below
Class 2.1 (eg LP Gas)	500 L	5,000 L
Class 2.2 Sub Risk 5.1 (eg oxygen)	2,000 L in cylinders	10,000 L
Class 2.3 (eg phosphine, liquid ammonia for fertilizer)	50 L in cylinders	500 L
Cryogenic fluids (eg for freezing vegetables)	1,000 L in containers less than 500 L	10,000 L
Class 3, 4, 5, 6 or 8 in PG I	50 kg or L in packages	500 kg or L
Class 3, 4, 5, 6 or 8 in PG II (eg petrol)	250 kg or L in packages	2,500 kg or L
Class 3, 4, 5, 6 or 8 in PG III (including some types of ammonium nitrate, kerosene)	1,000 kg or L in packages	10,000 kg or L
Class 9 ammonium nitrate fertilizer UN 2071, PG III	5,000 kg	10,000 kg
Mixed classes, where none exceed the quantities above	2,000 kg or L in packages, if the placard quantity for any Class present in packages is 2,000 kg or L or less.  5,000 kg or L in packages, only if the placarding quantity for packages shown above for an individual Class that is present is 5,000 kg or L	10,000 kg or L
C1 Combustible liquid in packages, eg Diesel fuel (distillate) in drums	1,000 L	10,000 L

Note that volumes for gases refer to the sum of the water capacities of each cylinder or tank containing the gas. Certain pressure vessels, such as tanks, also require item registration with WorkCover (including those forming part of industrial refrigeration plant, but not gas cylinders).

### 11.2.2 Placards

Placards (signs) indicating the hazard are required for storage areas or tanks containing dangerous goods in notifiable quantities (OHS Regulation clauses 174ZJ and 174ZK). These are based on the dangerous goods “diamond” symbol on the label (or the transport placard).

A dangerous goods symbol does not appear on containers of combustible liquids, since combustible liquids are not classified as dangerous for transport. However, bulk tanks must be placarded to indicate the contents. The placard must display the words “COMBUSTIBLE LIQUID” in black letters not less than 100 mm high on a white or silver background.

Store packaged dangerous goods in a secure area marked at the door with the appropriate Class diamond sign – eg the skull and cross bones for Class 6. If the goods are kept in only one part of the building, put another diamond sign next to or above the actual storage area.

Above placard quantities, consult the *Code of practice for the storage and handling of dangerous goods* for further advice on safe use, handling and storage. Class specific Australian Standards may also be applicable (these have the status of approved industry codes of practice in NSW).

### 11.2.3 Notification

Ask any WorkCover NSW office for a form DG1 Notification of Dangerous Goods on Premises. It includes notes on how to fill out the form and a contact number for further inquiries. It also includes guidance on licensing amounts for classes of dangerous goods not covered in this code.

At notification levels, manifests and written emergency plans are also required. Consult the *Code of practice for the storage and handling of dangerous goods* for further advice on preparing the manifest and emergency plan.

Even if you do not need to notify, for large quantities follow the advice in chapter 10 and this chapter regarding storage, such as the need for separation of storage areas and spillage control.

## 11.3 Explosives (dangerous goods of Class 1)

A strict licensing regime applies to explosives under the *Explosives Act 2003* and the *Explosives Regulation 2005*. The names of some certificates and permits have changed. You can keep any amount of ammunition without an explosives licence (providing it is not for sale).

A licensed magazine is required if you keep (for more than 24 hours) more than any of the following:

- 2.5 kg of blasting explosives
- 110 detonators
- 500 metres of detonating fuse
- 50 kg of security sensitive ammonium nitrate.

You cannot *use* explosives unless you have a Blasting Explosives Users Licence, appropriately endorsed, issued by WorkCover NSW (previously called a powderman’s certificate of competency). TAFE courses are available to enable you to obtain the necessary training. You also need this Licence to *purchase* explosives, and to *mix* explosives.

A security plan and restricted access is required when using or storing explosives (see also 11.7 below if ammonium nitrate is used to mix an explosive). Further advice is available from WorkCover (see the web site [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au) or phone 13 10 50).

## **11.4 Gases (Class 2)**

### **11.4.1 Class 2.1 – Flammable (eg LPG, acetylene)**

If you keep more than 500 L of LPG you should observe the Australian Standard *AS/NZS 1596 Storage and handling of LP Gas*. Installations must have a compliance plate issued by a licensed gas fitter.

Take into account the flammability hazard for the storage of other flammable gas such as LPG or acetylene. Flammable gases must be kept away from oxidising agents such as nitrous oxide, chlorine and nitrogen dioxide. A suitable separation is achieved by a vapour tight wall or a distance of three metres.

### **11.4.2 Class 2.3 – Poisonous/Toxic gases (eg ammonia, insectigas, fumigants, sulphur dioxide, chlorine)**

For Class 2.3, you will need to notify more than 500 L (water capacity of containers).

For the storage and handling of anhydrous ammonia observe the Australian Standard *AS 2022 Storage and Handling of Anhydrous Ammonia*.

Some fumigants are also flammable, but are allocated the primary risk of toxic (Class 2.3).

Further advice on gas cylinders can be found in Australian Standard *AS 4332 The Storage and Handling of Gases in Cylinders*, which should be observed if you are above placard quantities.

## **11.5 Storage of flammable liquids (class 3) and combustible liquids**

### **11.5.1 Typical flammable liquids**

Flammable and combustible liquids include the following:

- fuels (eg petrol, kerosene)
- alcohol at high concentrations (eg when used for essential oil extraction and in products)
- pesticides (and related materials such as surfactants) which are dissolved in a flammable liquid and classed as primary risk Class 3 and sometimes Sub-risk 6; or primary risk Class 6 and Sub-risk 3
- produce, such as alcohol, eucalyptus oil, orange oil, tea tree oil (or these used as solvents)
- diesel fuel (distillate) is a combustible liquid.

Alcoholic beverages, such as brandy or fortified wine, are not classified as dangerous goods if the alcohol concentration is less than 24 per cent. For bulk storage of alcoholic beverages of alcohol concentration above 25 per cent (UN 3065) you should check with WorkCover NSW to find out if you need to notify.

Australian Standard *AS 1940 – The Storage and Handling of Flammable and Combustible Liquids* should be observed. This applies to packages, such as drums, as well as bulk tanks and pesticides of risk Class 6 with Sub-Risk Class 3 (eg those in a flammable liquid solvent). AS 1940 does not apply to alcoholic beverages of less than 50 per cent alcohol.

AS 1940 also contains the requirements for filling tanks and drums when fuel is delivered to your property by tanker. Tanks and drums must not be “splash” filled.

Fuel storage tanks must be suitable and the relevant Australian Standards should be observed for their design. For example, converting an old milk tank to a fuel tank is not safe.

### 11.5.2 “Open land” exception

There is an exception from the provisions of AS 1940 for up to 5,000 L of PG I and PG II (eg petrol) and 10,000 L of diesel fuel (or other combustible liquids of C1 (old class 3.3)) if your storage is “on open land” and meets the following conditions:

- (a) such liquids are not intended for resale;
- (b) the land area exceeds 2 ha;
- (c) the ground around the storage is kept clear of combustible vegetation or refuse for a distance of at least 3 m;
- (d) the natural ground slope, or provision of a diversion channel, kerb or bund is used to prevent the potential flow of spillage from reaching any of the following:
  - (i) a “protected works” such as a dwelling or any building where people assemble, or any accumulation of combustible material (apart from flammable or combustible liquids),
  - (ii) a water course,
  - (iii) the property boundary;
- (e) the storage is at least 15 m from the boundary of the land and a “protected works” (see (d)(i) above);
- (f) if you have two or more storages of flammable or combustible liquids, each may be treated as a separate “minor storage” if the distance separating them is 100 m or more.

If you store flammable or combustible liquids above the amounts indicated above, and/or do not meet the “open land” conditions, then the full provisions of AS 1940 should be applied (such as a special store).

### 11.6 Flammable solids classes 4.1 and 4.3

Class 4.1 includes some smoke bombs.

Some fumigants may be classified as class 4.3 or may fall into another class in some forms. For example, the grain fumigant aluminium phosphide is class 4.3, (PG I, if UN No.1397) in the form of crystals, but in the form of waxed pellets it is class 6.1 (PG II or III). The hazard of class 4.3 is that they evolve dangerous or toxic gases on contact with water. This makes firefighting with water particularly hazardous.

### 11.7 Class 5.1 – Ammonium nitrate, Magnesium Chlorate Mixtures, Pool Chlorine (solid)

Ammonium nitrate fertilizer is Class 5.1, PG III if UN 2067, 2068, 2069, or 2070. Ammonium nitrate in a mixture with other types of fertilizer, if UN 2071, is in Class 9.

Ammonium nitrate should be kept at least 5 m, or separated by a liquid tight wall, from the following:

- combustible or readily oxidisable material
- flammable or combustible liquids (eg fuel), other Class 5 and Class 8 (corrosives)
- any other substances such as sulfur, powdered metal, magnesium chlorate mixtures or carbonaceous material.

A security plan and restricted access is required when using or storing any amount of ammonium nitrate (see also 11.3 above if used to mix an explosive). Further advice is available from WorkCover (see the web site [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au) or phone 13 10 50).

Magnesium chlorate mixtures (Chlorate and magnesium chloride mixture, UN No. 1459, PG III), such as those used as a defoliant in the cotton industry (eg “Magsol”) should be kept away from ammonium compounds, finely powdered metals, sulfur and combustible materials.

Pool chlorine (solid) is a powerful oxidiser and reacts with many other chemicals. Liquids such as fuels, oils and water must not come into contact with the pool chlorine as they cause fire and explosion. Some types of dry pool chlorine are also incompatible with each other.

## **11.8 Poisons (Toxic, class 6.1)**

When storing class 6.1 poisons above the placard limit (see quantities in section 11.2) the following is recommended.

### **11.8.1 Prevent the spread of spills and leaks**

Liquid poison should be stored in a bunded area – that is, there must be a liquid-tight floor and wall around the goods to contain any spills or leaks. If the liquid is in packages such as drums, the bund must be able to hold at least 25 per cent of the maximum quantity that the store holds. If the liquid is in a bulk tank, or in IBCs (Intermediate Bulk Containers, such as 1,000 L bulkboxes or similar), the bund must be able to hold the full contents of the largest tank or bulkibox. Make sure that packages cannot fall or spill outside the bund.

### **11.8.2 Fire extinguishers**

There should be at least one 9 kg powder extinguisher within easy reach, but outside of the bunded area. The extinguisher should be serviced every six months.

Detailed advice is provided in AS/NZS 4452 *The storage and handling of toxic substances*.

### **11.8.3 Keep other chemicals and combustible material away**

The only other materials that should be kept inside the bunded area are other compatible chemicals, or chemicals used to prepare pesticides for application such as wetting agents and flammable solvents.

Ammonium nitrate, acids, carbon disulphide, solid fumigants (showing a blue ‘diamond’ class 4.3 such as aluminium phosphide) and petrol should be kept at least 5 m away from the poisons area, or separated by a liquid tight wall. Greater distances may be necessary for larger quantities, especially if they are kept in the same building.

Materials that burn readily should be kept at least 5 m away from the poisons area. This includes liquid fuels, oils, gas cylinders, hay, straw, waste paper and rags, empty boxes, old tyres, sawdust, overhanging trees, tall dry grass and bushy shrubs.

Poisons should be kept 5 m away from foodstuffs and dangerous goods of other classes, or separated by a liquid tight wall.

Those liquid poisons (ie Class 6.1) that have a sub-risk of class 3 (ie. flammable) can be stored with flammable liquids (Class 3) in accordance with AS 1940 (see 11.5 above), including a class 3 placard. Look for both ‘diamonds’ on the container.

### **11.9 Class 8 – Corrosives**

Typical corrosives include wetting agents, sodium hydroxide used in cleaning tanks, and other cleaning agents and disinfectants.

When storing class 8 above the placard limit (see quantities in section 11.2) provide spillage control and fire extinguishers as for Class 6 – see 11.8.1 and 11.8.2 above.

Consult Australian Standard AS 3780 – *Storage and Handling of Corrosive Substances* for further advice on storing corrosives if you store and handle above placard quantities.

## CHAPTER 12 – PLANNING EMERGENCY PROCEDURES

Clause 17 of the OHS Regulation requires employers to provide for emergencies. Procedures should be developed to address risks such as spills and fires, and responses such as first aid and fire fighting. MSDS are important for planning emergency procedures. Use MSDS to obtain information on fire fighting equipment, chemical compatibility with water, and first aid requirements.

If dangerous goods are kept in quantities exceeding the “notifiable quantity” – see table in section 11.2 – a written emergency plan is required, and this must be submitted to the fire brigade (OHS Regulation clause 174ZC). Also consult the *Code of practice for the storage and handling of dangerous goods* for further advice in addition to this chapter.

### 12.1 Spills

#### 12.1.1 Spill containment

Provision must be made to deal with spills of those chemicals classified as dangerous goods (OHS Regulation clause 174Y).

To avoid spills, do not use damaged containers or leaking equipment. Avoid spilling chemicals on the external surfaces of containers or equipment, or on the ground at loading sites.

#### 12.1.2 Dealing with spills

To deal with minor spills, keep a “spill kit” of the equipment necessary to clean up spills at the mixing and storage sites. This “kit” should include an absorbent material, such as lime, sand, vermiculite, or a commercially available absorbent.

Manage accidental spills by ensuring that:

- the spill has ceased or is under control (eg shut off control valves, shut off pumps)
- the amount spilled is contained
- the chemical spilled is safely removed and disposed of properly
- the site is cleaned up and decontaminated.

Solid fumigants or other class 4.3 dangerous goods are incompatible with water so check the MSDS for water compatibility.

Steps to consider in the event of a spill are:

- (a) evacuate non-essential persons from the immediate area of the spillage;
- (b) wear protective clothing and equipment;
- (c) take immediate steps to control the flow of chemical from the spillage source;
- (d) call for assistance and/or raise the alarm if necessary;
- (e) move livestock from the area if necessary;
- (f) avoid direct contact with the chemical or fumes;
- (g) keep naked flames away from the area;
- (h) limit the spill area by restricting its spread, eg with a liquid use an absorbent material, or earth if this is unavailable;

- (i) powder or dust pesticides (but not fumigants) can be contained by slightly wetting the material with a fine water spray (unless incompatible) or covering with plastic sheeting to avoid the emission of dust;
- (j) cover the whole spillage area with absorbing material and allow time for the chemical to be absorbed;
- (k) sweep or scoop the mixture into an appropriately labelled container for reuse, or if contaminated place into one marked 'Waste for Disposal';
- (l) dispose appropriately (eg by burial, see section 8.4 c);
- (m) clean the site using methods recommended by the supplier.

Contaminated cleaning solution should be disposed of in the same manner as chemical waste. If soil is contaminated, remove the top layer of soil (5 to 10 cm) and dispose of it in the same manner as waste chemicals. Cover the ground area with hydrated lime and cover the lime with a layer of clean soil.

Any person involved in the emergency should shower, and wash all clothes separately from other laundry.

All fire fighting equipment and any remaining material should be de-contaminated with lime or hypochlorite bleach, depending on the chemicals involved, and then washed with soap and water.

The integrity of any containers surviving a fire should be checked to ensure that no further risks, such as slow leaks, are likely. In addition, the supplier should be contacted to find out the effect of heat on the chemical.



## 12.2 Fires

Consider the following steps when a fire occurs in a chemical store:

- other persons should be instructed to keep up-wind of the area and not enter the fire area unless suitably protected

- a full face respirator with a self contained air supply is considered the minimum protection for entry to the fire area
- if it cannot be quickly extinguished with the dry chemical extinguisher, then the appropriate fire control agent, usually a water fog or foam, should be used
- water can be used to keep containers cool (unless the contents are incompatible with water)
- consider the option of leaving the fire to burn and limiting its spread.

## **12.3 Emergency treatment – first aid procedures**

### **12.3.1 General instructions**

- read and follow the instructions on the label
- if the sufferer is unconscious, do not induce vomiting and do not administer anything by mouth
- first aid is only the first step, and is not a substitute for full professional medical treatment
- following first aid, take the sufferer to a doctor or hospital and make sure you take along the chemical container or label, or MSDS.

### **12.3.2 Specific first aid instructions:**

Check the following procedures for each route of entry:

- spilled on the skin or clothing*, remove the clothing immediately and thoroughly wash the skin with water or soap. Do not scrub the skin harshly and do not use ointments, powders or medication unless instructed to do so by a doctor.
- inhaled*, get the sufferer to fresh air and keep him/her lying down, warm and calm. If breathing stops, use mouth-to-mouth resuscitation.
- splashed into the eye*, hold the eyelid open and gently wash the eye with clean running water for 15 minutes. Cover the eye with a clean cloth and seek medical attention immediately.
- swallowed*, read the instruction on the label – it will direct whether or not vomiting should be induced. Examples where vomiting should not be induced are chemicals which are petroleum based (“Emulsifiable Concentrate”) or corrosive (acid or alkali).

## **12.4 Notification of accidents and illnesses**

The OHS Regulation requires employers to notify WorkCover NSW or the workers compensation insurance agent in certain circumstances. For further advice see the WorkCover web site

[www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au).

## **12.5 First aid requirements**

The OHS Regulation requires employers to maintain a first aid kit. Consider keeping a suitable kit in vehicles such as tractors and 4WDs.

# CHAPTER 13 – RECORDS

## 13.1 Legal requirements for record keeping

To assist risk management, accurate records should be kept of all aspects related to the assessment and control of chemical storage and use. Records should be made on prepared forms so that they can be easily completed and understood. Computerised records are acceptable providing employees are trained to use these.

For chemicals classified as hazardous substances or dangerous goods employers and self-employed must keep the following records:

- a register of chemicals and MSDS, which may include any notations in the register recording the risk assessment if no specific measures are necessary to control risks (OHS Regulation clauses 167 and 174W)
- those risk assessments that indicate a significant exposure risk to others at the workplace (OHS Regulation clause 168)
- records of the training of others engaged to work at the workplace by the self-employed person (OHS Regulation clauses 171(1)(b) and 174ZV)
- a record of the risk assessment of the storage and handling of dangerous goods if specific measures are required to control the risks (OHS Regulation clause 174ZX).

### 13.1.1 Employers

Employers must also keep the following records:

- risk assessments indicating a significant risk to employees at the workplace (OHS Regulation clause 168)
- records of health surveillance, if undertaken for employees (OHS Regulation clause 171(1)(a))
- records of monitoring, if undertaken for employees (clause 171(1)(b))
- records of training of workers (OHS Regulation clauses 171(1)(b) and 174ZV).

Choose a practical method of record keeping and avoid duplication. Records must be accessible to employees and WorkCover NSW inspectors. Up to six forms may be necessary, but some can be combined – examples are outlined below. Even when not legally required, it is good practice to keep these records.

Risk assessment reports must be readily available to any employee or other person working at the place of work who could be exposed to hazardous substances or store or handle dangerous goods (OHS Regulation clauses 168(2) and 174ZX(2)).

## 13.2 Types of records

### 13.2.1 Register

A register is a listing of all hazardous substances and dangerous goods in the workplace (OHS Regulation clauses 167 and 174ZW). This includes a list of the chemicals kept in a central store. The minimum information that must be included in a register is a list of all hazardous substances used or produced in the workplace, and the relevant MSDS.

This must include emissions such as welding fumes or dusts. You should also include dangerous goods on the register. An example is provided in appendix 3. This form is an example only and should be tailored to meet the specific needs of your business. If you have a small number of chemicals, this could be combined with the storage record, 13.2.3 below.

A record of daily use for chemicals purchased and used within 24 hours would suffice as a register – see 13.2.2 below. Consider using an existing QA or Integrated Pest Management (IPM) record system.

### **13.2.2 A record of pesticide usage form**

You should keep details of the following:

- type of pesticide(s) and chemicals used
- the name of the person who applied the pesticide
- date of use
- address where the pesticides were used
- application rates
- location of the application areas
- the pest targeted.

This form can also be used to record the assessment of spray drift risks. It also helps to plan pesticide use, such as rotating the type of active ingredient used. An example form is in appendix 2. This form is an example only and should be tailored to meet the specific needs of your business. Alternatively, it can be combined with the register form provided in the Farmsafe booklet *Register of Farm Chemicals*. For aerial contractors, a job sheet or a quotation form could be used as a register.

Contact the NSW Department of Environment and Conservation for advice about their record keeping requirements (telephone 131 555).

### **13.2.3 A storage site assessment record**

A storage site assessment record covers all activities related to the storage of chemicals including facilities for mixing and disposal. It should show how the risk factors are addressed. It should be reviewed yearly or when a new chemical is introduced or a work practice is changed. It can be combined with the register if these are the only chemicals and pesticides in use. An example form and checklist is provided in appendix 1. This form is an example only and should be tailored to meet the specific needs of your business. Use this as part of your dangerous goods risk assessment record as required by clause 174ZX of the OHS Regulation. Consider whether you may need to make MSDS available to emergency services.

### **13.2.4 Record of the risk assessment**

A record of the risk assessment should be kept where it indicates a significant risk arising from hazardous substances or dangerous goods, otherwise a notation on the MSDS in the register is sufficient (OHS Regulation clauses 168 and 174ZX). An example of a complex assessment form is given in appendix 4. This form is an example only and should be tailored to meet the specific needs of your business.

### **13.2.5 Records of health surveillance and monitoring**

Health surveillance and/or monitoring records must be kept for 30 years, if undertaken for employees (OHS Regulation clause 171). Records should indicate the names of workers, dates of medical exams or tests, and indicate if any adverse results were detected. The medical practitioner will also keep a record. These records are confidential, unless released by the employee.

### **13.3 Location and access to records**

Records should be located conveniently so that managers, employees and employee representatives can access the information. Suitable storage systems for records include book entry records, microfiche or computerised data bases.

WorkCover NSW inspectors and emergency services have the right to examine those records that must be kept by employers.

Clause 168(2) of the OHS Regulation requires employers to ensure that any risk assessment report prepared in relation to a hazardous substance is readily accessible to any employee or other person working at the place of work who could be exposed to the substance. Clause 174ZX(2) imposes a similar obligation in respect to dangerous goods.

### **13.4 How long to keep records**

Records are a valuable reference in case of incident or when an illness is reported. With good records, you can show that correct procedures were developed for storage and use of chemicals in your workplace. This is particularly important for long term (chronic) health effects.

Where an employee or other person is injured as a result of chemical exposure, an employer may be asked to show what action had been taken, or what instructions had been given regarding an employee's use of chemicals.

MSDS for a chemical should be kept and updated at the workplace while that chemical remains in use and for five years after use has ceased.

Application procedure records should be maintained for at least five years, unless health surveillance is required (see below).

Risk assessment outcome and action records should be maintained until they are updated.

Health surveillance records must be kept for 30 years because some health effects, such as cancers, may take a long time to become evident. If your business ceases to trade any health surveillance records should be offered to WorkCover NSW, for storage (OHS Regulation clause 171).

Records of training of employees must be kept for at least five years (see section 9).

# APPENDIX 1 – Chemical storage site assessment record

## Storage and handling

### 1. Training

1.1 Has training been provided to all who use the store? \_\_\_\_\_

1.2 What type of training? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

1.3 Accreditation certificate numbers \_\_\_\_\_

1.4 Any other certificate/training? \_\_\_\_\_

### 2. Storage

2.1 What types of chemicals do you hold, and what is the maximum amount of these chemicals you would hold at any one time?

Chemical	Dangerous goods class and Sub-risk (if any)	Maximum quantity (kg or L)	MSDS held? Y/N

2.2 Is a dangerous goods notification necessary? \_\_\_\_\_ Yes/No

*Some of the following questions have yes/no answers. Where you answer “no”, then this should be remedied.*

2.3 Are the MSDS held for these chemicals also held in the register (kept elsewhere)? \_\_\_\_\_ Yes/No

2.4 How is the chemical store made secure from access by unauthorised persons?

- locks (necessary if dangerous goods are stored)
- child-proof gates (if child access is a risk)
- other (specify) \_\_\_\_\_

2.5 How are the chemicals protected from moisture?

- On pallets:
- On shelving:
- Other (specify) \_\_\_\_\_

2.6 Are herbicides stored away from insecticides and fungicides? \_\_\_\_\_

2.7 How are spills controlled in the storage area?

- impervious and structurally sound bunds with adequate capacity?
- concrete sill and walls with adequate capacity?
- trays on shelves?
- metal cabinet (with in-built bund)
- other (specify) \_\_\_\_\_

2.8 If spills occur, what equipment is available to clean them up?

- lime
- sand
- absorbent
- broom
- shovel
- drum
- clean water for wash up
- other (specify) \_\_\_\_\_

2.9 Is the storage area resistant to fire? \_\_\_\_\_

2.10 What fire-fighting equipment is available?

- water hose
- water bucket
- dry powder extinguisher
- other extinguisher
- hose
- other (specify) \_\_\_\_\_

2.11 Have employees received training in emergency procedures? \_\_\_\_\_ Yes/No

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### 3. Mixing and preparation

3.1 Is spillage containment at the mixing site sufficient to contain the contents of the largest container used? \_\_\_\_\_

3.2 What personal protective equipment is available when mixing:

- Apron
- Gloves
- Face mask
- Goggles
- Respirator:    half      full
- Overalls
- Impervious boots
- Other – specify

3.3 What special safety precautions are taken when mixing chemicals in regard to ventilation, static electricity? \_\_\_\_\_

3.4 Is mixing carried out with more than one operator present or within shouting distance? \_\_\_\_\_  
\_\_\_\_\_

3.5 Is water available for personal washing? \_\_\_\_\_

### 4. Disposal

4.1 What procedures are used to dispose of chemical containers? \_\_\_\_\_  
\_\_\_\_\_

4.2 If there is excess chemical, what procedures are used to dispose of it? \_\_\_\_\_  
\_\_\_\_\_

## APPENDIX 2 – A record of pesticide usage form

Have you read the label? Y/N										
Date, start & finish time	Operator details	Crop or place where pesticide was applied	Type of equipment used	Name of pesticide used (incl mixtures)	Amount of concentrated product used (L or kg)	Total quantity applied	Size of block sprayed	Order blocks were treated	Estimated wind speed and direction	Other weather details

Application method	Nozzle type	Last calibration date	Pressure of operation	Protective equipment	Y/N	Outcomes (To be filled in later)
a. Boom b. Knapsack c. Air blast d. CDA e. Aerial f. Other (Specify)				Apron Gloves Face mask Goggles Respirator – half, full Overalls Impervious boots Tractor cab (filtered air) hat		Effect on pest population:  Effects/pollution off target (plants, streams, wildlife etc.):  Action taken as a result of reports of pollution:



# APPENDIX 4 – Example risk assessment record form

Work unit (job): \_\_\_\_\_ Person's name(s): \_\_\_\_\_ Assessment team: \_\_\_\_\_

Work area: \_\_\_\_\_ date: \_\_\_\_\_ time: \_\_\_\_\_

Summary of process: \_\_\_\_\_

Substance	Hazard information	Task	Exposure routes	Assessment/findings	Comments and /or controls

Controls in place: \_\_\_\_\_

Assessment result and recommendations: \_\_\_\_\_

Assessors signature: \_\_\_\_\_ Date: \_\_\_\_\_

Approved by, name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX 5 – Chemical exposure risk assessment checklist

Use this checklist as a basis for conducting a chemical exposure risk assessment:

**Step 1** Have you decided who will do it? Yes/No

**Step 2** Have you divided the work into units and listed the work tasks? Yes/No

**Step 3** Have all substances been identified? Yes/No

- Have you determined which are hazardous and/or dangerous? Yes/No

(If there are no hazardous substances or dangerous goods then no further action is required apart from recording this.)

- Has the register been compiled? Yes/No

**Step 4** Have you examined the MSDS and other sources of information on health effects? Yes/No

**Step 5** Has exposure been identified in each work task? Yes/No

For each hazardous substance find out:

- Is it released or emitted into the work area?
- Who is exposed?
- How much are persons exposed?
- What controls are proposed?

**Step 6** – What are the conclusions about risk – is it simple and obvious? Yes/No

If “yes”, go to the record step 8 below, if “no” decide if:

- risks are not significant
- risks are significant but controlled
- risks significant and not adequately controlled
- risks are uncertain

**Step 7** – Have actions resulting from conclusions been identified?

- no further action required? Yes/No
- seek expert help? Yes/No
- introduce control measures? Yes/No
- induction and training required? Yes/No
- monitoring required? Yes/No
- health surveillance required? Yes/No
- emergency procedures and first aid required? Yes/No

**Step 8** – Has the assessment been recorded?

- on the MSDS in the register? Yes/No
- on a record form? Yes/No

## APPENDIX 6 – Deregistered organochlorine pesticides – disposal and storage.

The following information has been provided by the NSW Department of Environment and Conservation.

The following organochlorine pesticides are no longer registered and it is an offence to use them.

- Aldrin
- Chlordane
- Dieldrin
- DDT
- Endrin
- Heptachlor
- Hexachlorobenzene
- Hexachlorophene
- Isodrin
- Lindane
- 2,4,5-T

These pesticide wastes cannot be disposed of to landfill or buried on premises where concentration is above certain thresholds. Owners of any of these pesticide wastes should store them pending collection or arrange collection for storage with a licensed waste contractor.

These pesticide wastes and containers, or other material contaminated with any of these wastes, are classified as scheduled chemical wastes, which are referred to as “waste” in the advice in this appendix.

The Department of Environment and Conservation's *Scheduled Chemical Wastes Chemical Control Order* sets out the requirements for the storage and transport of these pesticide wastes, which are summarised below. These requirements are in addition to the legal requirements for hazardous substances and dangerous goods outlined in other parts of this Code of Practice.

### ***Where less than one tonne (1,000 L) of these wastes are stored***

1. The occupier of any premises where such wastes are kept must ensure that an adequate supply of appropriate PPE (personal protective equipment), clean up materials and equipment (such as absorbents, spades, open head drums and brooms) is readily available in a secure area external to the storage area or storage tank.
2. The occupier of any premises where such wastes are kept must ensure that any person handling scheduled chemical wastes is trained in handling these wastes and the methods of containing spills. Appropriate PPE must be worn when handling wastes.
3. Keeping these wastes is subject to the following conditions:
  - all packages containing such wastes must be clearly marked
  - all packages of such waste must be maintained in good order. The contents of corroded or leaking packages must immediately be repacked into sound packages, and any spillages cleaned up
  - liquid wastes must be stored in accordance with Australian Standard AS 1940 – *The Storage and Handling of Flammable and Combustible Liquids*.

***Less than one tonne but more than 50 kg***

The following *additional* conditions must also be followed:

- the occupier of the premises must provide written notification to the Department of Environment and Conservation of the identity, amount and location of the scheduled chemical wastes kept in or on the premises, within 30 days of the date on which the quantity of waste becomes greater than 50 kg, and thereafter annually
- the storage area must be clearly identified and defined
- the storage area must be sited and constructed to prevent any discharge of the waste into the external environment.

***More than one tonne (1,000 L)***

There are additional requirements where more than one tonne of scheduled chemical waste (in total) is kept.

Consult the Chemicals Policy Section of the Department of Environment and Conservation for more advice on storage and transport (telephone 131 555).

## APPENDIX 7 – Risk assessment – a case study

Often chemicals are decanted and diluted. A farmer is examining the filling of a tank with pesticide. The MSDS or label indicate that the product should not contact the skin or eyes, and that impervious gloves and a face shield should be worn.

An inspection of the workplace reveals that the normal procedure is to stand on the ground and lift the container of liquid concentrate above head height and pour the contents into a tank on the application equipment. This procedure is adopted for convenience, but has the risk of spillage, ingestion and contamination of the worker's clothing. However, it is possible to climb onto a suitable and adequately guarded access platform on the rig and pour the concentrate at waist height. Alternatively, the use of a probe and pump would also reduce the risk of exposure and also reduces manual handling risks.

Thus, the assessment of this task is complete. It has been recognised that a potential risk exists and that performing this task without wearing appropriate PPE could lead to a problem. Also, it has been noted that the old method of work may lead to an incident where the concentrate is spilt over the worker. The outcome of the risk assessment is that:

- PPE must be worn for the job
- the concentrate must be added to the tank either from the access platform and not from the ground, or by the use of a probe and pump.

This has been noted on the MSDS, which is kept in the register, and kept as a record. The required controls can be easily applied.

## APPENDIX 8 – Publications and further information

### Relevant WorkCover NSW publications.

*First Aid in the workplace – Guide 2001.* Catalogue number 121.

*Reading Labels and Material Safety Data Sheets: how to find out about chemicals at work.* Catalogue number 400.

WorkCover NSW publications can also be viewed on the web site: [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au).

### Australian Standards

If you store relatively large quantities of chemicals then the following standard contains additional advice.

AS/NZS 2507 *The Storage and handling of agricultural and veterinary chemicals.*

### NSW Department of Environment and Conservation

NSW Department of Environment and Conservation publications can be obtained from their website: [www.epa.nsw.gov.au](http://www.epa.nsw.gov.au) or by telephoning 131 555.



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