

SAFE USE OF PESTICIDES INCLUDING HERBICIDES IN NON-AGRICULTURAL WORKPLACES

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) 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.

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* (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 as 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.

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 as a guide for persons working in the pest control industry, green keeping and other industries. It offers practical and informative guidance on how to comply with the relevant legislation relating to the use and storage of pesticides and herbicides.

This code of practice will promote safe and healthy practices in the use, storage and transport of pesticides 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 these hazardous substances.

Persons who will find this code useful include contractors, council workers, grounds persons and green keepers who use pesticides as part of their work duties as well as pest controllers. This code covers applications both in the field and within and around buildings.

This code will assist users to comply with the *Occupational Health and Safety Regulation 2001*. This code has also been written to ensure consistency with the *Pesticides Act 1999* and environmental legislation where relevant. It provides a single source of advice so that users will not have to consult several documents regarding occupational health and safety when using pesticides.

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 that illustrations in this code of practice are illustrative only and are not intended to demonstrate exact procedures.

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CHAPTER 1 – INTRODUCTION

1.1 Title

This code of practice is the *Code of practice for the safe use of pesticides including herbicides in non-agricultural workplaces*.

1.2 Purpose

This code of practice provides practical guidance on the safe use of pesticides, to protect the health and safety of workers using pesticides. This will assist users achieve a safe system of work and comply with the *Occupational Health and Safety Act 2000* and *Occupational Health and Safety Regulation 2001* relating to health and safety.

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

1.3 Scope

This code of practice applies to employers, self-employed persons and employees engaged in the end use and storage of pesticides (including herbicides), when used to control all types of pests. The scope includes the activities of green keeping, maintenance of parks, gardens and public places, retail nurseries and urban pest control (without limitation), apart from those activities listed below.

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

- (a) the use of pesticides in agricultural workplaces (except when the work is done by a licensed pest control operator in or around buildings). A separate *Code of practice for the safe use and storage of chemicals (including pesticides and herbicides) in agriculture* applies to all types of agricultural work.
- (b) the application of timber preservatives 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*.
- (c) the manufacture, warehousing, distribution or sale of pesticides.
- (d) the use of the following pesticides:
 - chlorine in swimming pools or for water treatment
 - substances used for sterilisation in health care facilities
 - anti-fouling paints on boats and ships.
- (e) mines within the meaning of the *Coal Mines Regulation Act 1982* or the *Mines Inspection Act 1901*.

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 of pesticides including herbicides in non-agricultural workplaces* 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*, and amended as provided by section 45 of the Act.

1.6 Definitions

Most of the following definitions are those used in the OHS Act and OHS Regulation. However, some have been specifically 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 (most recent edition).

agricultural workplace means a workplace predominantly engaged in the production of stock and/or crops and/or animal products (such as 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.

Note: These health effects are described in section 6.5. Health surveillance may be required, 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 L, 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.

Class means the Class allocated to dangerous goods under the ADG Code.

Note: Class reflects the type of hazard presented by the dangerous goods.

confined space means a space that may become contaminated or oxygen deficient.

Note: This is fully defined in clause 66 of the OHS Regulation. This is a space, which is not normally a work area and includes locations such as pits, tunnels and ventilation shafts.

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.

Note: The dangerous goods classification includes physical hazards such as flammability but also some health hazards. Some dangerous goods are also classified as hazardous substances. Diesel fuel is a combustible liquid, but defined as a dangerous goods under Chapter 6A of the OHS Regulation.

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

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

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

exposure means the contact between a person and a pesticide by any route.

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, which 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 *List of Designated Hazardous Substances*, published by the Commonwealth of Australia, as in force from time to time, or
- (b) fits the criteria set out in the *Approved Criteria for Classifying Hazardous Substances*, published by the Commonwealth of Australia, as in force from time to time.

Note: This covers substances that have an adverse health effect, as distinct from a physical hazard such as flammability covered by the dangerous goods classification. This information is available online by searching the Hazardous Substances Information System (HSIS) on the web site 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) a naked flame,
- (b) exposed incandescent material,
- (c) hot surfaces,
- (d) radiant heat,
- (e) a spark from mechanical friction,
- (f) a spark from static electricity,
- (g) an electrical arc,
- (h) any electrical, electronic, mechanical or other equipment.

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

Note: MSDS provides comprehensive health and safety information.

must means a legal obligation.

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

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

organophosphate pesticide is an organic compound containing phosphorous.

Note: These usually have the words 'anti-cholinesterase compound' or 'cholinesterase inhibitor' on the label. Health Surveillance may be required, see Chapter 6.4. The health effects are described in Chapter 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.

Note: This definition is the same as the Australian AgVet Code.

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 Australian AgVet Code definition.

place of work means premises where persons work.

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.

Note: Examples are supermarkets and hardware stores. A reseller or trade outlet is not a retailer since they are not selling consumer goods.

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.

scheduled poison means any substance contained in a schedule of the *Standard for Uniform Scheduling of Drugs and Poisons (SUSDP)* (Published by the Commonwealth Government, most recent edition)

should means that the work method or requirement described in this Code is optional, but if you choose an alternative you must be able to demonstrate that it is a safe system of work.

source of ignition see ignition source.

supplier includes a manufacturer, importer, wholesaler, reseller or distributor, but does not include a retailer.

use means any use of a pesticide and includes the production, handling, storage, transport or disposal of a pesticide for the purpose of end use.

worker, when used in this code of practice, includes employees, self-employed and any other person carrying out work activity.

workplace see definition of place of work.

CHAPTER 2 – LEGAL RESPONSIBILITIES

People who use or store pesticides in workplaces, treat workplaces, or supply pesticides for use at work, have legal responsibilities under the *Occupational Health and Safety Act 2000* (OHS Act) and the *Pesticides Act 1999*. This includes responsibilities for members of the public such as persons using facilities such as greens and parks. Employers and the self-employed have an obligation to establish and maintain a safe system of work.

Premises such as residences and parks are a workplace while the work of pesticide application is being carried out.

Other legislation requires pesticide users to take steps to protect the environment and other members of the public, including taking care when disposing unwanted chemicals.

This code provides advice, which will help you comply with the relevant legislation and establish a safe system of work. Where documents are referenced, make sure you consult the most recent edition.

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) 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. Information on training competencies can be found on the web site www.dec.nsw.gov.au/pesticides/training.htm

2.2 *Occupational Health and Safety Act 2000 (OHS Act) and OHS Regulation*

The OHS Act establishes general obligations on employers, self-employed persons, suppliers and employees which are intended to ensure the health and safety of all persons in workplaces including visitors. The OHS Act also imposes obligations on building owners (eg in the case of multi-tenanted buildings) and other persons in control of a place of work. These obligations apply to pesticides used in workplaces.

The OHS Act is supported by the OHS Regulation that specifies requirements for the supply and use of hazardous substances and dangerous goods in workplaces. This code of practice 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 to or used in a workplace, the requirements of both the OHS Act and the Pesticides Act, and related regulations apply. The classification of chemicals into the categories of scheduled poison, hazardous substances and dangerous goods, and their labelling, is the responsibility of manufacturers and importers.

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 pesticides. Employers have specific obligations to:

- ensure that information is available so that pesticides 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 employees, such as contractors and their employees, or members of the public (including those using a facility). This includes risks arising from the application of pesticides, spray drift and any residues left after application. This function may be delegated to a manager.

2.4 Self-employed persons

Self-employed persons include sole traders, contractors and sub-contractors. These 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 of the responsibilities in this code do not apply. However, meeting the relevant requirements of this Code will help to protect the health of self-employed persons.

2.5 Sources of information – suppliers of pesticides

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 which they supply for use at work.

Suppliers, including resellers, are responsible for passing on this information in the following ways:

- ensuring containers holding a hazardous substances, dangerous goods or pesticides are properly labelled
- 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 under the *Agricultural and Veterinary Chemicals Code Act 1994*, are usually suitable labels under the OHS Regulation.

2.6 Retailers and resellers

A retailer is someone who sells to any member of the public who is an end user. Retailers, such as supermarkets and hardware stores, are not required to provide MSDS to customers for consumer products. Examples of consumer products include home garden and household pesticides. However, retailers of pesticides should provide them to purchasers on request.

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

2.7 Employees

An employee working with or near pesticides 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 that may in their view affect compliance with any relevant legislation.

The general duties of employees are set out in sections 20 and 21 of the OHS Act.

2.8 Licensing of pest controllers and fumigators

Certificates of Competency are necessary for pest control for domestic, industrial and other uses. These are outlined below. They do not apply to pest control for agricultural or pastoral purposes.

Any person, self-employed or employed by a pest control business to control pests, must have a Pest Management Technician's Certificate of Competency.

Any person wishing to be trained in the pest control industry must be over the age of 17 to work on a logbook and be under the supervision of a person who holds a current Pest Management Technician's Certificate of Competency.

Those employed by any type of business or industry to control pests in or around building structures must also have a Pest Management Technician's Certificate of Competency. This includes structures such as a toilet block in a park, but not work such as weed control in streets.

A Fumigator's Certificate of Competency is also required for fumigators who use: chloropicrin, carbon disulphide, ethylene dichloride, ethylene oxide (except single dose canisters), hydrogen cyanide (hydrocyanic acid), methyl bromide or phosphine.

These Certificates of Competency are issued by WorkCover NSW.

2.9 Persons in control of workplaces

Persons in control of a workplace include the owners of multi-tenanted buildings. In such cases, if the owner or agent arranges pest treatment then it may be necessary for them to assess the risks to all occupiers and notify occupiers of occasions when pest treatment has been arranged. In the case of buildings, which are workplaces, it may be appropriate to provide information, such as MSDS, to occupiers.

2.10 Use of this code

In this code, words such as 'should', 'may' or 'consider' indicate recommended courses of action. 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 establish 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 pesticide issues that may affect their health and safety (OHS Act section 13). Since employees know their jobs they are often 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 implementing this code of practice.

Consultation involves the sharing of information and the exchange of views between the employer, employees and their representatives, or contractors. 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 with 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 pesticides, address:

- (a) identifying hazards and assessing risks associated with the storage and handling of the pesticides in use
- (b) planning the introduction of a new pesticide, new application method or modifying an existing process
- (c) deciding on control measures and how their use and maintenance can be checked
- (d) selecting and wearing PPE (personal protective equipment)
- (e) training requirements
- (f) communication with a contractor
- (g) advice on particular pesticides
- (h) the role of air monitoring and health surveillance, and the choice of a medical practitioner (where applicable)
- (i) ways of providing access to MSDS to employees and others at the worksite.



3.2 Advice to others at the worksite

Persons in control of multi-tenanted buildings (eg office blocks, flats) should devise a way of advising building occupants of intended pesticide treatment.

Persons in control of areas such as parks and greens should devise suitable ways of warning the public or other site users of areas which have been treated.

CHAPTER 4 – OVERVIEW- MANAGING THE RISKS OF PESTICIDES

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

- (a) identifying the pesticide hazards
- (b) assessing the degree of risk created by the pesticide hazards, in storage and work
- (c) determining how to eliminate risks and if this is not reasonably practicable, determining appropriate measures to control risks, including improving existing controls
- (d) ensuring appropriate supervision
- (e) ensuring appropriate instruction, education and training is provided to workers
- (f) recording any action or work procedure established for the workplace
- (g) checking the implementing and success of control measures.

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



4.1 Identification of hazards

Pesticide hazards in the workplace can be identified from the label on containers and the MSDS for the pesticides supplied to you.

Other types of hazards are not covered by this code of practice. For example, you may need to consider the physical risks arising from pressurised equipment. Information on the correct use of equipment should be obtained from the supplier or manufacturer.

4.2 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 the risk assessments when:

- (a) information on an MSDS changes (check that the MSDS are not more than five years old);
- (b) work practices change;
- (c) a new pesticide is introduced;
- (d) need is indicated by the adverse results of health surveillance or monitoring;
- (e) five years has elapsed since the last assessment (check you have the latest MSDS).

4.3 The types of risks

Risk assessments should be made to cover the following three major areas:

1. Risks to users from the preparation and use of pesticides where the emphasis is on controlling contact with chemicals (see chapter 6).
2. Risks to others from spray drift, residues, contamination and disposal (see specific control measures in chapter 8). This is particularly important for workers at premises such as bowling greens, parks and nurseries.
3. Risks to persons, property and the environment by accidental events such as spillage or fire in storage or transport (see chapter 10).

You may also need to assess other risks such as those arising from manual handling and the use of plant and equipment.

4.4 Controls

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

4.5 Records and the register of pesticides

Maintaining records is an important part of risk management.

The starting point is forming a 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 and 174ZW). Note that some pesticides will have both a hazardous and dangerous classification.

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.

There are several ways of forming a register and other records (see Chapter 12 Records).

CHAPTER 5 – IDENTIFICATION OF HAZARDS - SOURCES OF INFORMATION ABOUT PESTICIDES

Information about the hazards of a pesticide can be found on the package label, bulk container placard 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 pesticide and suitable application equipment.

5.1 Labels

5.1.1 Using the label

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

Hazardous substances, pesticides, dangerous goods and poisons, all have similar labelling provisions. Pesticide labels show the active ingredients and indicate other hazardous or dangerous ingredients (for example, by showing the dangerous goods 'diamond' symbol). More information can be found in the WorkCover publication *Reading labels and MSDS*.

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 that display the relevant information.

5.1.2 Read the label

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 the 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.

5.1.3 Storage

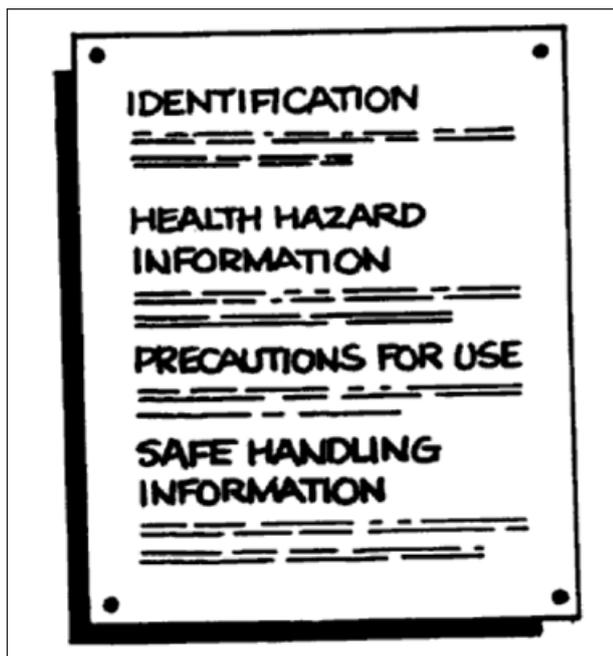
Stores of packages over certain quantities and bulk tanks containing dangerous goods require placards (ie labels and notices) under the OHS Regulation. Generally, these dangerous goods requirements do not apply to pesticides when mixed and diluted for use.

5.2 Material safety data sheets (MSDS)

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

- identification
- health and physical hazard information (including the dangerous goods classification if applicable)
- precautions for use at the application strength, including the exposure standard
- safe storage and handling information
- hazardous and/or dangerous ingredients (not just the active constituent)
- emergency procedures (to assist planning).

Use MSDS for guidance on the safe use and storage of pesticides. Other persons working in the area being sprayed or treated may also need to see the MSDS on request.



Advice on the correct use of equipment should be obtained from the supplier or manufacturer. Some pesticide formulations are intended for use with specific methods of application with the correct equipment.

5.3 Obtaining MSDS and the provision of MSDS to others

5.3.1 Obtaining MSDS from the supplier

The OHS Regulation requires that a supplier must provide an MSDS for each hazardous substance or 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.

Resellers, such as a person who supplies to trade only, are not retailers, since the goods are not in consumer packages, and so they must provide MSDS. Trade sales include substances intended solely for use in workplaces, and so MSDS must be provided to you on request.

5.3.2 Employer duties

MSDS must be made available to all employees who may be exposed to the pesticide in use if it is a hazardous substance (OHS Regulation clause 162).

Employers must ensure that an MSDS is available for each hazardous substance and dangerous goods used by each employee (OHS Regulation clauses 162 and 174ZG). This access may be required on the following occasions:

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

At each work site, 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
- 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 Act they should make an MSDS available to others at the worksite 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 and pouring it directly into a spray tank.

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

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

Do not decant a pesticide 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, labelling is not necessary where the following are met:

- 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 and consumed 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 kept in a labelled container or disposed of according to label directions (see sections 8.5 and 8.6).

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 contractor (see guidelines in sections 8.5 and 8.6).



CHAPTER 6 – ASSESSING EXPOSURE RISKS

6.1 Duties

6.1.1 Assess risks to all persons

Employers are required by the OHS Regulation to assess the health risks of all work with pesticides that are classified as hazardous substances and the physical risks of dangerous goods. This includes pesticides that are in current use and new pesticides that are introduced. This includes risks to seasonal and casual workers, and risks to non-employees at the worksite.

Self-employed contractors must assess the risk to other persons working at the site and visitors. Employers and self-employed persons have a duty of care to members of the public who may come into contact with the pesticide, or with hazardous residues after application. Persons in control of a workplace should pass relevant information on to others in workplaces who may come into contact with spray drift or residue.

6.1.2 Circumstances of your work

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 factors such as the temperature and wind. Off-label use may require a thorough risk assessment as the label precautions may not apply. In such cases, you must follow the permit conditions.

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

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 single general assessment and apply it to several locations where the hazard and degree of risk are comparable, such as where the same pesticide is used in a number of different locations in similar circumstances. This may be relevant to contractors who do the same work in different locations. General assessments will help simplify the overall task of assessment of the different locations where you work. Typical examples are applying a pesticide to a bowling green, or spraying for borer underneath a typical house.

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, which are too high or too low.

6.2 Routes of exposure for health risks

There are three ways pesticides can enter the body, called routes of exposure. Consider each possibility separately in the risk assessment:

- **Inhalation** is an important route of entry. Exposure occurs by breathing in airborne concentrations of a pesticide in the form of an aerosol, vapour or mist. For example, such a risk could occur when spraying.

- **Skin contact** is a common route of entry. Many pesticides 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 pesticides is often the cause of ingestion. Dusts and aerosols can be breathed in and then swallowed.

6.3 Exposure standards and air monitoring

The OHS Regulation requires employers (and 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. This exposure must not be greater than the relevant exposure standards in the *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*. This information is also available on the web site www.ascc.gov.au by searching the hazardous substances information system (HSIS). 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.

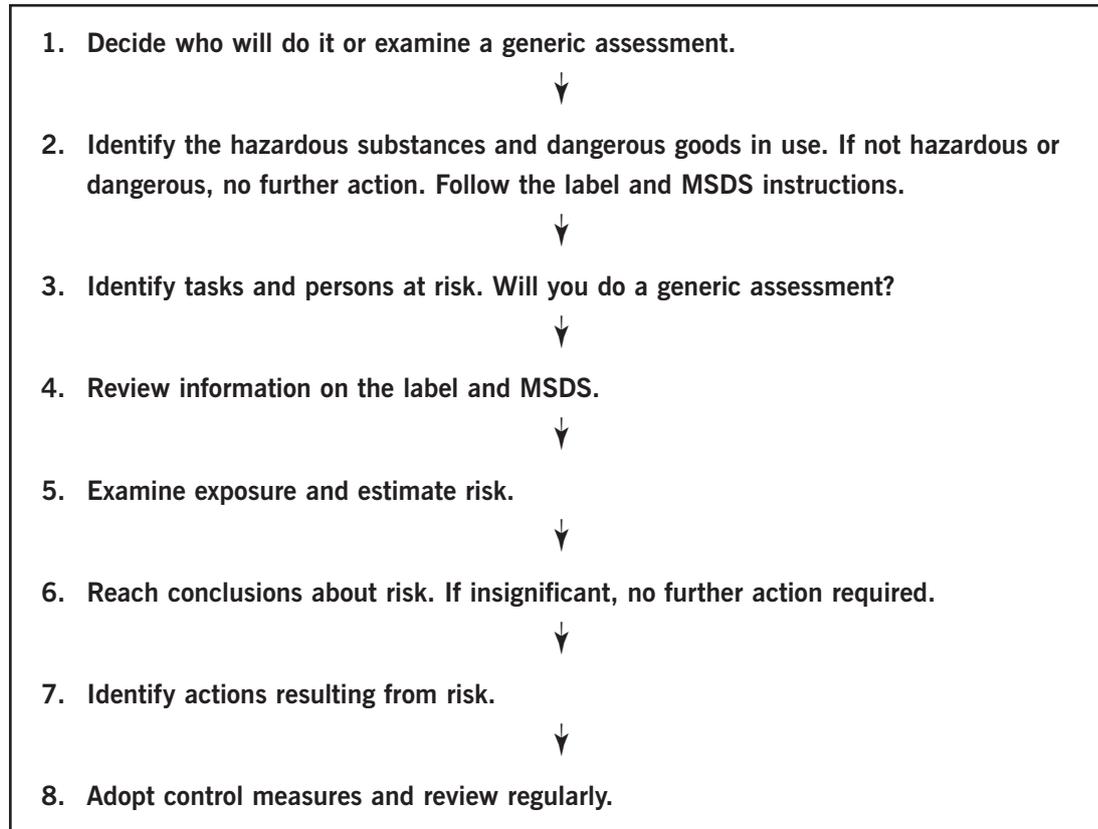
For pesticides, strict compliance with the safety directions on the label and MSDS will normally ensure that exposure is sufficiently controlled so that quantitative measurement will not be necessary. If spraying releases vapour or aerosol, the airborne exposure standard may be exceeded and control measures such as respirators or other PPE should be considered to protect the health of workers.

If there is uncertainty about risks, it may be necessary to measure airborne concentrations and compare these with the mandatory exposure standards. This is possible where inhalation is the main route of entry. This may be useful for enclosed locations such as indoors. This may be necessary in cases 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 pest controllers or employers 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 pesticides 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 generated in your workplace from items not covered by a label or MSDS, should also be considered.

Identify from the label and MSDS the pesticides and other chemicals, which are classified as:

- dangerous goods
- hazardous substances
- scheduled poisons.

These classifications can be identified through the symbols or words on the container, or for those which are hazardous, from a statement on the MSDS.

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 (but these do not need MSDS).

A risk assessment is not necessary for the use of substances that are not classified as hazardous or dangerous. Some herbicides and pesticides with low human toxicity may not be hazardous or dangerous, and so the remaining steps of the risk assessment can be omitted.

Step 3 Identify persons at risk and tasks

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

- (a) mixing, decanting or preparing (including handling the concentrate)
- (b) spraying
- (c) handling in the storage area
- (d) loading and handling on vehicles
- (e) the occupants of treated buildings or those likely to come into contact with hazardous residue after spraying
- (f) cleaning, adjusting and maintaining equipment
- (g) entry into dusty areas such as roof cavities which could be contaminated (eg with asbestos)
- (h) other persons entering treated areas such as in parks and greens.

Use the list in section 6.6 as a checklist of high risk activities.

Step 4 Review the information from the label and MSDS

For each pesticide find out:

- the degree and type of hazard (eg flammability, toxicity, risk of cancer or foetal damage)
- routes of exposure likely from 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 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. If you are not using the recommended controls then you will need to take steps to adopt these (see also chapter 7).

Step 5 Estimate exposure and risk

To estimate exposure and risk, inspect the work practices and existing control measures. To estimate exposure consider:

- (a) evidence of contamination – visible dust or fumes, dust on surfaces, skin or clothing, visible leaks, spills, or residues, odour
- (b) direct contact with the substance, such as handling powder without gloves
- (c) splashes
- (d) experience or symptoms of exposure (including evidence of individual susceptibility)
- (e) likely vapours or hazardous residues remaining after the application of the pesticide
- (f) spray drift and risk of contamination to adjacent areas
- (g) 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 the:

- likelihood of exposure
- length of time of exposure.

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

Likelihood of exposure

The likelihood of exposure must 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:

- (a) the situation (eg is it an enclosed space or well ventilated?)
- (b) the form of the substance (eg is it a powder, vapour or gas? Does this change with temperature?)
- (c) are workers using the Personal Protective Equipment (PPE) prescribed on the label or in the MSDS?
- (d) are engineering controls such as ventilation currently used?
- (e) how often is the pesticide used?
- (f) the likely airborne concentration of the pesticide in comparison to the exposure standard
- (g) spray or dust drift and the factors such as particle size, wind speed and temperature

- (h) access of people to a treated area or contact with hazardous residues
- (i) contamination near areas where food is produced, stored or used.

Length of exposure (contact time)

The length of time a person is in contact with a pesticide directly affects the dose. Also consider the possible contact others may experience, for example the occupants of a treated building. Contractors who use a pesticide every working day will have a much higher potential exposure than employees who use pesticides only occasionally, as part of other duties (eg grounds maintenance).

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:

- (a) exposure is high (eg length of time and/or likelihood of exposure is high)
- (b) the pesticide is highly toxic (even if exposure time is short)
- (c) the health effect is severe. Both the chronic (long term) effects and the acute (short term) effects must be considered. Check the MSDS
- (d) leaks or spills might occur
- (e) individual characteristics, for example the individual is particularly susceptible, such as evidence of previous allergic reactions or other symptoms, 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, or in the case of off-label use, where the permit conditions are followed.
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 (see section 6.5 below).
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. 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 (check the list of hygienists in the WorkCover NSW OHS Directory, available on disk).

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 pesticide 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 (kept by the employer or self-employed person).

You may have to include a note on the conditions of use such as not using the pesticide when it is too hot or too windy.

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

- (a) select appropriate measures to achieve and sustain control (see section 7);
- (b) ensure that those control measures are properly used and maintained;
- (c) arrange induction and training, especially in areas where the assessment indicates risks are not easily controlled; and
- (d) 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. However, it may be appropriate to assume that they are exceeded, for example if an aerosol or suspension in the air is produced.

Step 8 Adopt control measures and review regularly

Record conclusions about risk and controls. Details of recording an assessment of risk and the controls chosen are covered in the next Chapter 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 5.

6.5 Health surveillance

Advice should be sought from an authorised medical practitioner on 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 pesticide. 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. This is particularly important for contractors who have regular exposure to pesticides.

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

- checking control measures by confirming that the absorbed dose is below the accepted level – the dose may arise from either use or contact with treated areas
- detecting biological effects requiring cessation or reduction of exposure
- collecting data to evaluate the effects of individual exposure over a period of time (for example to see if it is increasing or decreasing).

6.5.1 Requirements under the OHS Regulation

The OHS Regulation (clause 165) requires that health surveillance be undertaken for employees who have a risk to their health from using pesticides containing the following:

- organophosphate pesticides (identified by the word anti-cholinesterase on the label or MSDS, but not carbamate pesticides)
- inorganic arsenic compounds such as arsenic trioxide.

The 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. Tests are available for some herbicides, and pesticides containing heavy metals, such as chromium. 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. For example, contractors who regularly use a variety of chemicals should consider health surveillance.

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.

6.5.2 When health surveillance should be undertaken

Health surveillance should be undertaken 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 pesticides, who should have 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:
 - (i) Establish a baseline at a time when there has been at least four weeks without exposure. This is to establish 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 (a copy of the record of use form).
 - (ii) For very occasional use no test is needed unless the person has symptoms, which could be related to exposure. Very occasional use is a period of half a day per month or less.
 - (iii) 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.
 - (iv) 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 telephone **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 on how frequently it should be done. The medical practitioner must follow the health surveillance procedure listed in clause 165 of the OHS Regulation if the risk assessment shows a *significant* risk of exposure to these chemicals.
- (c) Arrange for people to carry it out (for example, a person to take blood or urine samples).
- (d) Provide the supervising medical practitioner with access to a list of hazardous substances for which the health surveillance is required, the MSDS, the exposure standards, and discuss the results of the risk assessment reports.
- (e) Make acceptable arrangement for employees to participate in the health surveillance program.
- (f) Pay the expenses of health surveillance for employees, including wages (see clause 165(5) of the OHS Regulation).
- (g) Keep records confidential (OHS Regulation clause 166(2)). Records should include when it was done, names of workers and adverse outcomes if notified 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).

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 testing or examinations may be necessary for individuals showing an adverse effect.

6.6 Health effects of organophosphate pesticides

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

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 pesticide 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.

High risk activities

Activity	Risk factors
Mixing and loading	<ul style="list-style-type: none"> • Handling liquids or dust in concentrate form. • Pouring concentrates under awkward conditions where splashes are highly likely.
Boom spray operation	<ul style="list-style-type: none"> • Filling tanks above head height increases risk of spills if manually performed. • Wind blowing spray onto the tractor operator. • Operator is wet from waist down when adjusting nozzles. • Operator blows or sucks blocked nozzles.
Blower misters	<ul style="list-style-type: none"> • Blower misters create a fine mist that remains in still air for long periods or could drift to neighbouring properties. • High exit velocity from blower can cause widespread contamination.
Hand held application equipment, such as knapsack tank and wand	<ul style="list-style-type: none"> • Leaking equipment wets back, buttocks and legs of the operator. • Incorrect use of handpiece can cause spraying onto feet and legs leading to a high skin absorption rate. • Spraying above shoulder height may cause the operator to be covered by blow back of mist leading to exposure by skin contact and inhalation. • Hot working conditions increases operator absorption.

Activity	Risk factors
Spraying by wand from tractor supply or ag bike tank	<ul style="list-style-type: none"> • Feet and legs can be sprayed by mist deflected from plants and the ground. If the pressure is too high, a fine mist will blow back on operator. Absorption is via skin and inhalation. Hot working conditions increase skin absorption. • Ag bikes and quad bikes (ATVs) can become unstable if overloaded by a spray tank leading to overturning and spillage of pesticide.
Enclosed spaces or confined spaces	<ul style="list-style-type: none"> • Entering buildings, where atmospheric contaminants and asphyxiants will not disperse quickly. Consider the asphyxiation risks arising from the use of gaseous propellants and dispersants such as carbon dioxide. The higher temperatures in areas such as roof cavities may increase the risks. • Entry into building cavities such as under-floor areas or roof spaces may include confined spaces. Additional hazards are posed by mould spores, sewerage leaks, gas leaks and vermin. You may need to check oxygen levels. • Exhaust fumes from pumps powered by internal combustion engines may create an additional hazard.
Fumigation	<ul style="list-style-type: none"> • Fumigants move into the gaseous phase and so are lethal by inhalation. • Risk of hazardous residues in the area or material fumigated and the need to control entry by non-authorized persons.

Advice on control measures is covered in the next two chapters.

6.8 Further advice on assessing health risks

Additional advice on the assessment of health risks is provided in NOHSC's *Guidance Note for the Assessment of Health Risks Arising from the Use of Hazardous Substances in the Workplace*.

CHAPTER 7 – MANAGING THE CONTROL OF PESTICIDE RISKS

The OHS Regulation requires that measures must be adopted that eliminate, or if that is not reasonably practicable, to control the risks of pesticides, if classified as a hazardous substance or a dangerous goods.

The purpose of control measures is to eliminate or reduce exposure to pesticides in the actual circumstances of use and storage, and to control physical risks such as flammability. It may be necessary to adopt more than one control measure to reduce risk. Also consider controls that reduce environmental impact, including the reduction of waste. Take the registration conditions on the label of pesticides into account when considering the practicality 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 control may be needed for best exposure protection.

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

7.1.1 Elimination and reduction

The use of a pesticide can be eliminated by removing the pest through manipulation of the environment, and at the same time benefiting production and the environment including the elimination of wastes. Consider practices that use the following methods:

- better hygiene
- removing pest breeding areas
- biological control and beneficial insects
- resistant plant or grass varieties wherever they present a feasible alternative
- physical barriers
- biotechnology and integrated pest management (IPM).

Do not use deregistered pesticides.

7.1.2 Substitution

It may be possible to substitute a pesticide for a less hazardous one without leading to less effective pest control. Examples of substitution include the following:

- using a less toxic pesticide
- using a less volatile pesticide
- altering the physical form such as replacing an emulsifiable concentrate formulation with a granular formulation, or using encapsulated products to reduce handling risks
- checking suitability for use in buildings and subsequent re-entry by occupants
- purchasing only returnable or reuseable containers.

7.1.3 Isolation

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

- separate areas used for storing, mixing and preparing pesticides with limited access to all but properly authorised employees
- carriage of pesticides in a section of a vehicle isolated from the driver and passengers during transport
- storage in a separate room or building
- using an air conditioned truck or tractor cabin with properly functioning and maintained activated carbon filters designed to remove pesticide vapours during application.

Where using an air conditioned truck or tractor cabin, observe the following precautions:

- check door seals for wear
- keep windows, doors and hatches or vents closed and airconditioning 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 control

An engineering control is a system which:

- minimises the generation or emission of a pesticide
- suppresses or contains a pesticide
- delivers the pesticide 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 work indoors if air contamination is likely, for example in a green house.

Examples of engineering controls include:

- using an extraction ventilation equipment (ventilator) to remove vapours after treatment
- changing nozzle parameters or droplet size or spray pattern
- using a purpose designed workplace with good natural or mechanical ventilation (adequate air movement)
- use of building ventilation such as running the air-conditioning after treating an office area.
- use of low volumes of pesticide when treating buildings.

7.1.5 Administrative controls and work practices

Administrative controls include work practices, which you adopt in order to control risks. These controls include: taking weather conditions into account, the time of work, hours of work restrictions, who does the work and who has access to a work area or pesticide store. Administrative controls are implemented to ensure safe work practices are adopted in the workplace and that the 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 an office building after normal working hours.
- (b) Limiting the time period of exposure for an employee.
- (c) Prohibiting eating, drinking and smoking when handling pesticides.
- (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 to minimise heat stress or spray drift.
- (f) Correctly calculating the area to be treated and amount of spray required. (This has the added benefit of minimising the amount used and costs).
- (g) Notifying other persons such as neighbours, the public who use parks or greens or other building occupiers or users (eg by the use of signs).
- (h) Signs around treated areas indicating the hazards.
- (i) 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 pesticide 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 employees, 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 pesticide 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. Guidance is given below.

Use labels and MSDS (material safety data sheets) 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 must wear appropriate eye protection. This could be in the form of safety glasses, goggles, a face shield, or full-face respirator.

Select eye protection that 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 eyewear 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 that conform to 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 shows phrases such as avoid inhalation of spray, or vapour, or dust.

Select respirators that conform to 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 must 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 or supplier 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.

Select footwear which conforms to AS 2210 *Occupational Protective Footwear Part 2 Specification*, which 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.

In some cases, safety footwear is necessary. Where impact, cuts or chemical spills are possible, the footwear should conform to Australian Standard AS 2210. 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 pesticides 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 are evident). 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 (OHS Regulation clause 171).

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 instruction or training to ensure an appropriate application procedure is followed and the equipment is correctly used (unless the operator is licensed or appropriately certificated)
- consider including suitable weather conditions in the assessment and restricting chemical use if the weather is unfavourable.

7.3.2 Form of the record

For most users, a simple report attached to the original MSDS or written on the MSDS and dated would be sufficient (this must be kept by the employer or self-employed person for at least five years).

For example, if the MSDS for a pesticide states:

- do not use in a enclosed space
- wear a respirator with an Australian Standard number.

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.

For a large operation, where the same pesticide 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 covered by the assessment
- (d) work area, date and time of assessment
- (e) a list of pesticides 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 pesticide 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 Chapter 13.



CHAPTER 8 – RECOMMENDED SPECIFIC CONTROL MEASURES

8.1 Fumigation controls

Persons carrying out fumigation should apply all of the procedures, including warning notices, in *AS 2476 General Fumigation Procedures*, except when using ethylene oxide.

Employers must ensure that fumigation is carried out by a licensed fumigator (see section 2.8).

The risk assessment should examine the risks of hazardous residues and the need for precautions when unloading fumigation rooms, cabinets or transport containers.



8.2 Spray drift risks

To reduce risks from spray drift observe the following precautions:

- (a) Check wind speed and direction (see section 8.3 below).
- (b) Use a formulation or product which reduces spray drift (if available) or an alternative application method (if permitted on 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.
- (c) Choose equipment that is designed to reduce or eliminate drift, if permitted by the pesticide label. Equipment should be used according to the manufacturer's instructions and be chosen for the particular pesticide and target requirements.

For each type of application equipment, variables such as nozzle type, hydraulic pressure, and height of delivery 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 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.

8.3 Weather conditions and time of day

If conditions are not suitable to minimise potential risks from drift, the spray operation should be delayed until conditions are suitable. This should be included in a general risk assessment.

It is preferable to use technologically superior spraying equipment, which may allow spraying to occur in a wider range of weather conditions without creating a drift hazard.

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

Rain may cause run-off of the pesticide, and this should be considered in the assessment of environmental risk. Check the rain-fast period. Pesticides must not be applied if rain is likely to wash the pesticide from the site of application.

8.3.1 Field application such as boom spray

If spray drift is possible (eg an aerosol will be produced), ensure that spraying is done in cross-wind conditions rather than directly into or with the breeze. Spraying should only take place when the breeze is blowing away from an area that may be at risk from drift. High temperatures may cause smaller droplets or vaporisation, which may increase spray drift.

8.3.2 Treatment in and around buildings or small areas (eg a bowling green)

Calm stable weather conditions may be appropriate, and preferably early in the morning or late in the afternoon when insects such as bees, and the public, are at minimal risk.

8.4 Waste and disposal

Some pesticides are no longer registered and cannot be disposed of on site – see Appendix 7.

Never dispose of pesticide waste or rinsates down drains, toilets, sinks, gully traps or into bodies of water.

Never dispose of wastes or containers into public litter bins, private garbage bins or leave out in the street for municipal collection.

8.4.1 Minimising disposal

Minimisation of use is an important way of minimising potential environmental and health harm. Consider eliminating or reducing pesticide use (see the hierarchy of control in Chapter 7).

- (a) Choose the least persistent product available for the application (this may not be an option where persistence of a residue is required for effective treatment).
- (b) Purchase pesticides in reusable or returnable containers if possible. Otherwise try to 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.

8.4.2 Surplus pesticides

The options in descending order of preference are:

1. Return unopened containers to the supplier or manufacturer.
2. Use the pesticide for its intended purpose.
3. If the container is sound and the label intact, offer surplus pesticides 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 pesticide to be removed.
5. Label and store securely, pending one of the above actions.

8.4.3 Burial of wastes on owner's property

It is unlikely that burial will be an option for contractors such as pest controllers.

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 pesticide on your property, note that:

- the label conditions on disposal should be followed
- only pesticides 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 firstly be diluted and then disposed in a pit drain at least one 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 wastewater
- the pit drain should be backfilled so that the pesticide is covered with at least 500 mm of soil, and a different site chosen for future wastewater 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 biodegradable 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.



If you store or generate hazardous waste then you must be licensed under the *Waste Avoidance and Resource Recovery Act 2001*.

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

8.5 Disposal of empty containers

Empty containers must be rinsed and disposed of, or recycled 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.

8.5.1 Triple rinsing

An effective manual rinsing procedure is:

1. On emptying the contents into the spray tank, drain the container for an extra thirty 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 the entire inside with rinse.
5. Remove the cap and add rinsate from the container to the spray tank. Drain the contents for an extra thirty 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 reuse 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 must 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

8.6 Re-entry periods

The re-entry period is the period in which a treated area must not be re-entered by unprotected persons including members of the public, after the application of a pesticide. This should be considered as part of the risk assessment. Workers and others must be advised of the correct time lapse to avoid contact with hazardous residue. Consider this during the risk assessment, the choice of pesticide formulation and method of application. Note that it is intended that some treatments leave a residue.

If the re-entry period has been established it should be stated on the label or other advice from the supplier.

In field applications, where no re-entry period is stated wait at least 24 hours, subject to the risk assessment of hazardous residue, unless appropriate PPE is provided and worn as intended. For grasses, use the rain-fast period of a pesticide or the drying of the pesticide on the target as guides.

After the re-entry period has been observed, some PPE may be necessary if some skin contact or other exposure to hazardous residues is possible. Appropriate PPE should be indicated in the risk assessment.

Buildings should be ventilated according to the label and MSDS directions following the application of pesticide indoors. Dispersal of solvent vapours should be considered as part of the risk assessment. The atmospheric concentration of contaminants must not exceed the exposure limits after applying a pesticide indoors. It is important to consider this in relation to re-entry to the building by other persons.

8.7 Handling and contact with residues

Exposure may occur when:

- persons enter treated areas to carry out further work
- handling or packing dipped or treated materials or unloading containers
- dusts are produced when using mechanical equipment or bulk transfer
- fumigants are emitted during transfer from bulk silos
- unloading fumigation rooms or transport containers.

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

8.8 Control of risks to other people at or near the worksite

Pesticides are often applied in places such as houses, parks and clubs where the protection of other people is an important objective.

To control risks:

- (a) Do not allow others, including children, in the vicinity of the areas where pesticides are being sprayed or mixed, to prevent contact or exposure.
- (b) Provide copies of MSDS to other people at the workplace, if requested.
- (c) Pesticides must be kept away from children. Keep vehicle carrying pesticides locked or supervised.
- (d) After the application of pesticides indoors, make sure that hazardous residues are not left on surfaces or suspended in the air so that building users will not come into contact with excess pesticide residues which still present a hazard. For example, observe a re-entry period. Consider this during the risk assessment.
- (e) Control spray drift risks.

Notify the owner or occupier of the site prior to the commencement of spraying. Prior to commencement of treatment advice should be given to the person in charge of a workplace to enable other users to be informed in an appropriate way. Persons in charge should consider advising all the tenants in a multi-tenanted building. This advice should include the:

- (a) type of pesticide to be sprayed
- (b) time of spraying
- (c) area to be sprayed
- (d) precautions to be observed prior to application (such as emptying kitchen cupboards)
- (e) re-entry period and other risks such as run off contaminating the environment
- (f) hazards and risks associated with the pesticides to be used
- (g) consider the use of signs or barriers in multi-tenanted buildings, parks or greens.

Notification to building or site owners can be done at the time of providing a quote or job sheet.

Owners or occupiers should notify occupants or users by the use of signs or temporary fencing.

8.9 Checking controls and assessment of personal exposure

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

8.9.1 Preparing, mixing and handling concentrate

- (a) Great care should be taken when handling the concentrate or powders, the time of greatest risk.
- (b) Wear appropriate protective clothing and equipment and have an adequate supply of filters for the respirator.
- (c) Preparation and mixing should be done in a well ventilated area. Stand upwind while opening, pouring and mixing.
- (d) Do not eat, drink or smoke while mixing pesticides.
- (e) 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).
- (f) Avoid leftover prepared spray by effective and accurate calibration of equipment, and calculation of the amount to be used (in accordance with the label instructions).
- (g) 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). Where they are not recyclable punch a hole to render them unusable. The water used to rinse the container should be added to the spray tank during mixing.
- (h) Spills should be cleaned up immediately.
- (i) Prepare pesticides in the application tank or on a drip tray over an impervious surface at least 15 metres from any waterway.
- (j) If the pesticide is flammable, decant away from likely sources of ignition.

8.9.2 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 assessing the relevance of wind direction and strength. Never spray in high winds, and stop spraying if weather conditions deteriorate.
- (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 building or areas, note the presence of items such as animals, play areas for children or toys, openings in buildings where spray can drift, and washing on clothes lines.
- (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.

8.9.3 Clothing and equipment

When choosing PPE, in accordance with the label, MSDS and risk assessment, use of the following items should be considered:

- (a) Cotton overalls buttoned to the neck and wrist.
- (b) Pesticide resistant water-proof aprons when mixing or pouring concentrate.
- (c) Gloves (pesticide resistant), preferably gauntlets, to be worn when handling or using pesticides.
- (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.
- (h) Full face air-line respirator when working in enclosed spaces
- (i) Self-contained breathing apparatus for entry into confined spaces.

8.9.4 Washing and equipment clean up

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

Contractors or employees who work at sites where there is no available water may need to carry water to enable prompt and proper clean up.

When appropriate after application:

- (a) Remove any residue on external surfaces of equipment.
- (b) PPE should be worn during cleaning, and must also be cleaned after use.
- (c) Any pesticide washed from the tank should be reused or sprayed over the area treated.
- (d) Water used for hosing down equipment and machinery should be collected in a sump or soakaway pit.

- (e) Remove and wash any contaminated protective clothing and equipment.
- (f) Wash or shower thoroughly with water and soap. Employers should provide adequate washing amenities including water, soap and towel.
- (g) Change clothes, and store and wash work clothes separately from other laundry. You may need a special container for contaminated clothing.
- (h) Vehicles and other equipment used to apply herbicides must be washed down at least 15 metres from a waterway.
- (i) Vehicle mounted spray equipment should be washed down on a hardstand area.
- (j) Washdown water must not flow or percolate into any waterway or area of high water table.



8.9.5 Use and maintenance of respirators

- (a) Ensure that the correct type of filter is used (see section 7.2).
- (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:
 - 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.
 - 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 touches 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) Face piece, valves, filters and hoses are in good condition and well maintained.
- (f) The inside of the respirator is not exposed 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 pesticides in the air even when they are not being worn. This will shorten the use life of the filter. Keep the filter in an airtight 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 the risk to health and safety, and provided in an appropriate manner.

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. Advice on the level of training required under the *Pesticides Act 1999* can be found on the web site www.dec.nsw.gov.au/pesticides/training.htm.

The OHS Regulation also requires pest controllers to be trained. This is a TAFE or WorkCover NSW approved course, in addition to on the job training and supervision. A person may work and undertake training, to be recorded in a logbook, providing they are supervised by the holder of a current Pest Management Technician Certificate of Competency. Training is also required for fumigators. Some persons will have received appropriate training as part of an accredited course (eg greenkeeping).

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, as outlined below.

9.1 Provision of training by employers

The detail and the extent of a training program will depend on the hazards and risks associated with the pesticides that are used and the work procedures and appropriate to the duties performed. This should be considered when doing the risk assessment. Consider fitting this in with other aspects of occupational health and safety training in your workplace.

An example of suitable training (for those not covered by the pest control licensing training) on the use and application of pesticides, is the Farm Chemical End User Training Course (also known as the FarmCare course or ChemCert).

Induction training into the circumstances and equipment used in your workplace is necessary for new employees. Training should be considered when an employee is assigned to a new task or a new 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 pesticide
- workers who are supervising others working with a pesticide
- those who are required to work in close proximity to where pesticides 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 pesticide or hazardous residue.

9.2 Training about the requirements of legislation

A training program should cover:

- duties under the OHS Act and Regulation
- applying this code of practice
- advice regarding the pesticides that may be stored or used in the workplace
- the legal significance of a label and any restrictions resulting from it
- relevant and up to date legislation or guidance material relating to the transport, use, storage and disposal of pesticides.

9.3 Information on a substance

Where relevant, training should also cover:

- (a) 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.
- (b) 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.
- (c) How to obtain access to the MSDS, and the information each part of the MSDS can provide.
- (d) The selection, use, maintenance and storage of safety equipment required.
- (e) Any work practice or procedure to be followed in any aspect of the use of a pesticide in the workplace, including any appropriate Australian Standard, WorkCover NSW Code, or national code to be followed.
- (f) Re-entry periods.

9.4 Personal safety

Where relevant, training should also cover:

- the routes of entry into the body of pesticides
- the risks posed by pesticides 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
- entry into enclosed spaces and any special precautions
- entry into confined spaces (where applicable) and the use of self-contained breathing apparatus.

9.5 Application of pesticides

For those employees who apply pesticides, training should also cover the application of pesticides including:

- identification of pests
- 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 worksite.

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
- spill control and initial measures to establish control in emergencies
- decontamination
- first aid or incident reporting procedures where injury or illness to other persons has occurred
- arrangements for calling emergency services.

9.8 Review of training

Regularly review training when there is a change in any of 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, a Pest Management Technician's Certificate of Competency number or fumigation Certificate of Competency licence number, and/or details of any courses they have attended (eg, certificate numbers for TAFE courses or end user courses).

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

CHAPTER 10 – TRANSPORT AND STORAGE RISKS

Storage risks relate to emergencies, such as fires, spills, accidental exposure or ingestion. Accidents and spillages may occur when opening containers, handling or mixing pesticides. For advice on spills see section 11.1.

The exposure of any person close to the incident may be high. This can be controlled by reducing the likelihood of an incident occurring, and establishing emergency procedures to reduce its severity.

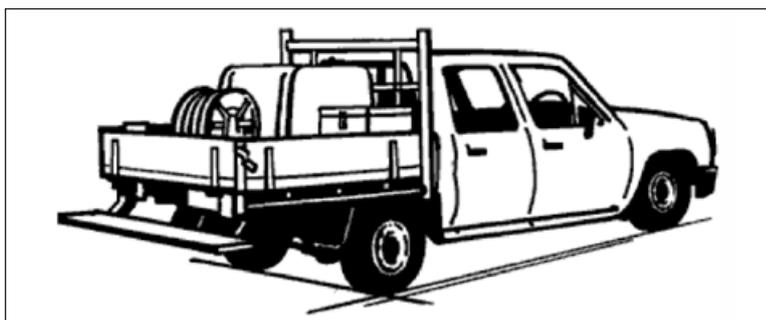
Some pesticides are classified as dangerous goods and have specific storage requirements above a certain amount. The requirements of the Australian Code for the Transport of Dangerous Goods (ADG Code) do not usually apply to the transport of pesticides in the course of a business using pesticides.

10.1 Transporting pesticides in pest control vehicles

Vehicles used for pest control should be designed so that the pesticides are separated from the driver and other occupants, and restrained. Utilities or table-top vehicles provide an in-built separation. Commercial vans or station wagons should incorporate an airtight partition between the seating area and the load carrying areas of the vehicle.

When transporting pesticides observe all of the following precautions:

- (a) Personal protective equipment, a change of clothes (to change into in case of contamination), food and drink, should be carried in clean containers preventing contact with any pesticide.
- (b) Pest control equipment and pesticides carried on the vehicle should not be in contact with porous surfaces.
- (c) The internal and external surfaces of the vehicle, and the surfaces of pesticide containers and spray equipment, should be kept free of pesticide contamination.
- (d) The vehicle should be kept locked to prevent public access to pesticides. Protect the load from the weather. Do not leave your loaded vehicle unlocked or unattended.
- (e) Do not accept or load damaged or leaking containers. Secure the load and limit its movement.
- (f) Gas cylinders should be restrained, and those of a liquefied gas kept in an upright position. Gas cylinders should not be transported or kept inside a vehicle, such as a van, without adequate and permanent cross-flow ventilation (eg a special ventilated compartment). Cylinders must not be carried externally to the vehicle. (External means outside the frame of the chassis work. Mounting on a trailer tow bar is acceptable.)
- (g) Tanks on the vehicle should be labelled with the words:
POISON: Followed by the common name of the pesticide)
AVOID CONTACT
HAZARDOUS PESTICIDE



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

Large operations should check the amounts for which marking of the vehicle and other special conditions are mandatory under the ADG Code and transport legislation.

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

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

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

10.3 Storage risks

When assessing risk for stored pesticides, consider the following factors:

- (a) Quantity of pesticide to be stored.
- (b) Duration of storage.
- (c) Dangerous goods class, Packing Group and other characteristics of the pesticides with respect to toxicity, stability and compatibility (see the MSDS or supplier).
- (d) The requirements for separation of pesticides from other classes of dangerous goods. For example, Class 5 oxidising agents, such as solid pool chlorine, are incompatible with many other substances.
- (e) Spillage control (for liquids), fire rating and ventilation of the building.
- (f) Emergency procedures and equipment needed in the store (consult the MSDS on fires and other emergencies).
- (g) Separation from other stores of chemicals.

Suitable separation distances, the isolation of spills and suitable emergency procedures should be considered even when small quantities of pesticides are stored for short periods.

10.4 Storage quantities

10.4.1 Identifying types and quantities

You should use a designated storage area for pesticides if storing more than 100 kg or 100 L. This may be a cabinet, part of an existing store or a purpose built store. Reducing the quantity of pesticides stored is one of the most cost effective ways of reducing the risk. Many pesticides 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.

A metal cabinet is appropriate for even small amounts of highly toxic or dangerous pesticides, such as dangerous goods in Packing Group I (but not gases, because ventilation is required – see section 10.6).

For relatively small amounts, consider using trays with spill containment on shelves.



Step 1 – Check the factors to consider

If a dangerous good in Packing Group I 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 then consider either a:

- cabinet
- segregated area
- purpose built store.

Step 3 – If over 250 kg/L of any one type, then check if you need a dangerous goods storage licence or other special conditions (see 10.4.2 below). If over 1000 kg/L notification is usually required.

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

10.4.2 Larger quantities and notifying WorkCover

Australian Standard AS 2507 *The storage and handling of agricultural and veterinary chemicals* is an approved code of practice in NSW and should be observed if you have more than 1000 kg or L of pesticides and related agricultural chemicals of any type or class of dangerous goods (apart from gases).

For other dangerous goods above the notification quantities indicated below, consult the *Code of practice for the storage and handling of dangerous goods* for further advice on safe storage. Class specific Australian Standards may also be applicable.

Over certain aggregate quantities WorkCover must be notified (OHS Regulation clause 174ZS). This depends on the Class and either the Packing Group, or sub Class for gases. You need to check quantities when you form the Register (see section 12.2.1) and aggregate these in terms of dangerous goods Classes and Packing Groups. You may need more information from WorkCover – see the website www.workcover.nsw.gov.au.

As examples, the following must be notified:

- (a) Cylinders of Toxic gases of Class 2.3 (eg Fumigas, Insectigas, Sterigas or ethylene oxide) if over 50 L (water capacity of cylinders). This will probably be exceeded if you have one large cylinder or two small cylinders.
- (b) Other Classes such as Flammable liquids (eg solvents in Class 3), Class 6 (Toxic) or Class 8 (Corrosive) in:
 - PG I above 50 L or 50 kg;
 - PG II (eg petrol) above 250 L or 250 kg;
 - PG III (eg kerosene) above 1000 L or 1000 kg.
- (c) More than 5000 L or kg of mixed classes.
- (d) Diesel in an above ground tank if more than 10,000 L.

10.5 Storage design (solids and liquids)

Consider using a secure separate building, or a segregated area within a building, with:

- (a) cross-flow ventilation
- (b) concrete floors with drainage into a sump
- (c) concrete door sills
- (d) concrete or block walls to a sufficient height to contain spills
- (e) impervious shelving (or spill control trays on shelves)
- (f) a lockable door (essential if dangerous goods are stored)
- (g) a clean up kit for spills
- (h) access to water for washing and cleaning.

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 pesticides, and at least 100 per cent of the largest package or container.

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 rain water). 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 pesticide, 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 packaging and labelling does not deteriorate (especially cardboard containers).

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

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).

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 located and fitting a child proof latch.
- (c) The risks to children, visitors to the workplace, and members of the public who are not familiar with the hazards of pesticides.
- (d) The dangerous goods Class and Packing Group of the pesticide stored and any separation distances required from other buildings or stores (including outdoor bulk tanks and drums of dangerous goods).

10.8 Pesticide containers

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

Ensure that all original labels remain legible and on the container (see sections 5.1 and 5.4). 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 Emergency procedures

Employers must make appropriate arrangements for emergencies (OHS Regulation clause 17).

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

- 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.

Above 'manifest' quantities, a written emergency plan is required – see section 10.4.2.

10.10 After assessing storage facilities

Following the assessment of the storage risks:

- take steps to remedy any high risk areas and situations as soon as possible
- notify WorkCover NSW of the storage if necessary
- establish emergency procedures or review existing procedures
- improve the quality of storage areas where it is practicable
- make plans for the construction of future storage areas if necessary.

10.11 Storage assessment record content

In a storage assessment record note down how all the factors in this chapter have been addressed. A single site assessment record should be adequate in most workplaces or storage sites. Appendix 1 gives a suitable form.

CHAPTER 11 – PLANNING EMERGENCY PROCEDURES

Procedures should be developed to address spills, fires, first aid and the notification of accidents.

In an emergency you need to ensure the safety of all personnel. If the emergency cannot be dealt with immediately raise the alarm and call the fire brigade.

Use MSDS to plan emergency procedures. Check the pesticide compatibility with water, and the fire fighting equipment and first aid, which may be required.

11.1 Spills

11.1.1 Spillage containment

Spillage controls must be set up for dangerous goods (OHS Regulation clause 174Y). This is good practice for all pesticides.

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

11.1.2 Dealing with spills

Manage accidental spills by ensuring the following:

- the spill has ceased or is under control
- the amount spilled is contained
- the pesticide spilled is safely removed and disposed of properly (see section 8.4)
- the site is cleaned up and decontaminated.

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 pesticide from the spillage source (for example, close valves, turn off pump);
- (d) call for assistance and/or the fire brigade if necessary;
- (e) avoid direct contact with the pesticide or fumes;
- (f) keep naked flames away from the area;
- (g) limit the spill area by restricting its spread, eg with a liquid use an absorbent material, or earth if this is unavailable. For large spills you may need to call the fire brigade;
- (h) powder or dust pesticides (but not solid fumigants) can be contained by slightly wetting the material with a fine water spray or covering with plastic sheeting to avoid the emission of dust. Class 4.3 are incompatible with water;
- (i) cover the whole spillage area with absorbing material and allow time for the pesticide to be absorbed;
- (j) sweep or scoop the mixture into a container. If uncontaminated, recover for future use by placing into an appropriately labelled container. If contaminated, the container should be marked 'Waste for Disposal';
- (k) dispose appropriately;
- (l) clean the site using methods recommended by the pesticide supplier.

Contaminated cleaning solution should be disposed of in the same manner as pesticide 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 pesticides. 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 decontaminated with lime or hypochlorite bleach, depending on the pesticides 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 pesticide.

11.2 Fires

Storage and handling areas where dangerous goods are kept should have suitable fire protection, such as a fire extinguisher and a water hose.

Where a fire occurs in a pesticide store consider the following steps:

- (a) Call the fire brigade.
- (b) Other persons should be instructed to keep up-wind of the area and not enter the fire area unless suitably protected.
- (c) A full face respirator with a self contained air supply is considered the minimum protection for entry to the fire area.
- (d) If the fire cannot be quickly extinguished with the dry chemical extinguisher, then the appropriate fire control agent, usually a water fog or foam, should be used.
- (e) Water can be used to keep containers cool.
- (f) Consider the option of leaving the fire to burn and limiting its spread.

11.3 Emergency treatment – first aid procedures

11.3.1 General procedures

- 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 pesticide container or label, or MSDS.

11.3.2 Specific first aid instructions

Check the following procedures for each route of entry:

- (a) *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.
- (b) *inhaled*, get the sufferer to fresh air and keep him/her lying down, warm and calm. If breathing stops, use mouth-to-mouth resuscitation.

- (c) *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.
- (d) *swallowed*, read the instruction on the label – it will direct whether or not vomiting should be induced. Examples where you should not induce vomiting are pesticides that are petroleum based ('Emulsifiable Concentrate') or corrosive (acid or alkali).

The OHS Regulation requires employers to maintain a first aid kit. Consider keeping a suitable kit in each pest control vehicle.

11.4 Notification of illness and injury

The OHS legislation requires employers to notify the Workers Compensation agent or WorkCover NSW of any work-related injury or illness suffered by an employee in certain circumstances. See FAQs about notification on the WorkCover web site www.workcover.nsw.gov.au.

CHAPTER 12 – RECORDS

12.1 Legal requirements for record keeping

To assist risk management, accurate records should be kept of all aspects related to the assessment and control of pesticide storage and pesticide 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 pesticides classified as hazardous substances or dangerous goods, it is compulsory under the OHS Regulation for employers and self employed to keep the following records:

- a register of pesticides including MSDS, which may include a notation regarding the risk assessment if no specific measures are necessary to control risks (OHS Regulation clauses 167 and 174W)
- risk assessments indicating a significant 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).

Employers must also keep the following records:

- risk assessments indicating a significant exposure 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 employees (OHS Regulation clauses 171(1)(b) and 174ZV).

Examples of suitable record forms are outlined below with some forms provided in the appendices. Some can be combined. Keeping these records is good practice, even if you are not legally required to do so.

Some of these may be combined with other occupational health and safety records for your workplace, for example records of training or health surveillance.

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)).

12.2 Types of records

12.2.1 Register

A register is a listing of all hazardous substances and dangerous goods in your workplace. This includes a list of the pesticides kept in a central store or a pest control vehicle.

The minimum contents of a register are the list of all hazardous substances and dangerous goods used, handled or stored in the workplace, and the relevant MSDS (OHS Regulation clauses 176 and 174ZW). 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.

For pesticides purchased and used on the same day, a record of use is a sufficient list (see (b) below, but you must also keep the MSDS).

12.2.2 Record of pesticide use form

You should keep details of all of the following:

- pesticide(s) and chemicals used
- the name of the person who applied the pesticide
- date of use
- address or location of area where the pesticides were used
- application rates (field applications only)
- location of the application areas (within premises or property)
- the pest targeted.

Ways to keep this record are:

- An example form, suitable for field use (eg green keeping, parks), is in Appendix 2, which can also be used to record the assessment of spray drift risks. This form is an example only and should be tailored to meet the specific needs of your business.
- Users such as pest controllers could retain copies of quotations, job sheets, invoices or receipts as a record of this information, providing all relevant details are shown.

Contact the NSW Department of Environment and Conservation for advice about the record keeping requirements under the *Pesticides Act 1999* (telephone 131 555).

12.2.3 Storage site assessment record

Use this if you store a total of more than 100 L or 100 kg of pesticide in total.

A storage site assessment record covers all activities related to the storage of pesticides including facilities for mixing and disposal. It should show how the risk factors are addressed. It should be reviewed yearly or when a new pesticide is introduced or a work practice is changed. It can be combined with the register if these are the only pesticides and pesticides in use. An example is provided in Appendix 1. This form is an example only and should be tailored to meet the specific needs of your business.

12.2.4 Pest control vehicle assessment record

Where a vehicle is in regular use, a record should be kept of:

- how is PPE kept on the vehicle
- the condition of containers, tanks and equipment
- checks for contamination of surfaces.

12.2.5 Record of the exposure risk assessment

A separate record of the risk assessment should be kept by employers where it indicates a significant risk of exposure, otherwise a notation on the MSDS in the register is sufficient (OHS Regulation clause 168).

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.

12.2.6 Records of health surveillance and monitoring

Health surveillance and/or monitoring records must be kept for 30 years, if undertaken for employees (OHS Regulation clauses 171(1)(c) and 172). Records should indicate names of workers, dates of medical examinations or tests and whether or not there were any adverse results.

If your business ceases to trade, you should offer these records to WorkCover NSW.

The medical practitioner will also keep a record.

12.2.6 Fumigation

Additional declarations, notices and records are required, as described in section 5 of Australian Standard *AS 2476 General Fumigation Procedures* for fumigation.

12.2.7 Training

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

12.3 Location and access of 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 databases.

WorkCover NSW inspectors may examine the records of employers that are required to be kept by the OHS Regulation, so you should find a suitable way to make these accessible.

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.

12.4 How long to keep records

The time for which records related to the exposure to hazardous substances must be kept are set out in the OHS Regulation clause 171.

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 pesticides 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 pesticide 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 pesticides.

MSDS for a pesticide should be kept and updated at the workplace while that pesticide 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. 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.

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

APPENDIX 1 – Pesticide 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 pesticides do you hold, and what is the maximum amount of these pesticides you would hold for more than 12 hours at any one time?

Pesticide	Dangerous goods class or sub-risk	Maximum quantity kg or L	MSDS held in store? Y/N

2.2 Is notification of the dangerous goods to WorkCover 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 pesticides also held in the register? Yes/No

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

- locks (essential if dangerous goods are stored) _____
- child-proof gates (if child access is a risk) _____
- other (specify) _____

2.5 How are the pesticides 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:_____

2.9 Is the storage building or area resistant to fire?_____

2.10 What fire-fighting equipment is available?

- water hose
- water bucket
- dry powder extinguisher
- other extinguisher
- other_____

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

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 pesticides 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? Yes/no?

4. Disposal

4.1 What procedures are used to dispose of pesticide containers? _____

4.2 If there is excess pesticide, what procedures are used to dispose of it? _____

APPENDIX 2 – A record of pesticide usage form (field application)

Have you read the label? Y/N										
Date, start and finish time	Operator details	Place where pesticide was applied	Type of equipment used	Name of pesticide used	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	(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) Other – specify		Effect on pest population Effects/pollution off target (plants, streams, wildlife etc) Action taken as a result of reports of pollution

Pesticide application by: _____

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 / controls recommended

Controls in place: _____

Assessment result and recommendations for additional controls: _____

Assessor's signature: _____ Date: _____

Approved by, name: _____ Signature: _____ Date: _____

APPENDIX 5 – Risk assessment checklist

Use this checklist as a basis for conducting a workplace 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 or dangerous pesticides then no further action is required, apart from recording this conclusion.

- 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, are exposure standards likely to be exceeded?
- What controls are proposed?

Step 6 What are the conclusions about risk?

- 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 – Risk assessment review: a case study

A review of the risk assessment can be simple and straight forward, as shown by the following hypothetical example at an imaginary holiday resort 'Ocean Waves'.

Ocean Waves has extensive gardens stocked with plants supplied from its own nursery, an eighteen hole golf course and a four rink lawn bowls complex.

Past risk assessments at Ocean Waves have helped to lower the amount of pesticide used, and the costs, by indicating that much spraying was unnecessary due to excessive routine preventive spraying. Spraying is now done only during those danger periods when a particular pest is about to become active. Other non-pesticide controls have been introduced. For example, different watering practices have reduced the reliance on fungicides.

But despite decreasing the overall amount used, the green keepers and nursery employees still need to regularly use a number of pesticides. The review of the risk assessment at Ocean Waves addressed the following points.

Process

Tractor mounted spraying equipment is regularly used on the golf course for pesticide application. In the nursery, gardens and on the lawn bowls rinks, hand-held equipment is used. The review revealed four main stages to the pesticide application process: storage, mixing, application and equipment cleaning.

Inspection showed that the storage area was not securely locked, and was not bunded to contain spills. However, a hose was available nearby for washing down spills. Gloves and other PPE for use when mixing was readily available in the storage area and used.

Plastic paddles were available and always used for mixing the pesticides. Bare hands were never used.

A review of the personal protective clothing used by the operators of the spraying equipment revealed that all respirators were of an approved design, and that the filters were suited to the pesticides used. The operators were using the respirators in accordance with the directions on the container labels and MSDS. New filters were readily available and used when required.

Technicians were using the recommended type of gloves when mixing and spraying, and were also observing the policy that required PPE - including overalls, hat, and footwear – during the pesticide application. Care was being taken to minimise spray drift.

However, the assessment also showed that spills for the area where the application tanks were filled flowed directly into the resort stormwater drainage system. When spraying has been completed, equipment and machinery was washed down and the run-off also flowed into the resort's drainage system.

A review of information and training showed that the grounds supervisor had obtained some posters and leaflets and these were displayed and used in training.

Controls

However, the assessment indicated that despite wearing gloves, skin contact occurred because operators did not wash the gloves before removing them. Minor spills were being ignored rather than being cleaned up immediately and as a consequence maintenance staff were being exposed.

While there was no suitable substitute for all of the pesticides, some less toxic substitutes had now come onto the market since the last assessment and now should be used to reduce the overall level of risk.

Excluding unnecessary people from work areas when pesticide vapours are evolved during mixing and application will also reduce the number exposed, making controls simpler.

To solve the problem of run-off during wash up of equipment and spills, a designated wash-down area was designed with its own drain and filtration system, to harmonise with the resort's environmental plans to retain and use all rainwater.

In the greenhouse area, to ensure that controls are effective, it is sometimes necessary to measure exposure levels. This was done by an occupational hygienist taking air samples as part of a complex risk assessment. Health surveillance was arranged for one employee who frequently used organophosphates.

In these ways, the risks at Ocean Waves continued to be controlled, and the review is complete.

APPENDIX 7 – 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 the 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 pesticide 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 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 (1000 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 personal protective equipment (PPE), clean up materials and equipment (such as absorbents, spades, open head drums and brooms) are 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 pesticide 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 be 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 pesticide 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 (1000 L)

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

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

A dangerous goods keeping licence from WorkCover NSW may also be necessary.

APPENDIX 8 – Further information and publications

Publications cited

Department of Environment and Conservation, *Environmental Guidelines – Assessment, Classification and Management of non-liquid wastes*.

Department of Environment and Conservation, *Environmental Guidelines – Assessment, Classification and Management of liquid wastes*.

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

Exposure Standards for Atmospheric Contaminants in the Occupational Environment, Australian Government, Canberra. This can be seen at the web site www.ascc.gov.au

Relevant WorkCover NSW publications.

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

Health and safety at work: greens, gardens and grounds. Catalogue number 119.

Reading Labels and Material Safety Data Sheets: how to find out about chemicals used at your workplace. Catalogue number 400.

WorkCover publications can also be viewed on the web site: www.workcover.nsw.gov.au

Other useful publications

Termiticides (Safe Use) Code of Practice. National Health and Medical Research Council 1996.

Australian Standards

If you store relatively large quantities of chemicals then the following standards contain additional advice.

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

AS/NZS 3833 *The Storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers*.

Catalogue No. **WC00421** WorkCover Publications Hotline **1300 799 003**



WorkCover NSW 92-100 Donnison Street Gosford NSW 2250
Locked Bag 2906 Lisarow NSW 2252 WorkCover Assistance Service **13 10 50**
Website **www.workcover.nsw.gov.au**

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