

EPA Guidelines for Responsible Pesticide Use

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1 BACKGROUND

This guideline brings together in one document the requirements that regulate the responsible use of pesticides. These requirements are contained in the several state and federal Acts, associated regulations and other instruments, described in detail in section 3 of this guideline. These requirements cover environmental legislation as well as other legislation not administered by the EPA but relevant to pesticide use. They include pesticide registration and labelling, licensing of pest controllers and commercial sprayers, dangerous substances administration and occupational health and safety requirements.

1.1 The importance of pesticides to society

Pesticides are legitimate and useful tools that can provide significant benefits to our society. To maximise these benefits we need to use pesticides in a safe and efficient manner; misuse of pesticides can cause harm to people and the environment.

In primary industry the application of herbicides to control weeds and insecticides to control invertebrate pests can improve the yield and quality of food and fibre crops. Chemical dips protect livestock from parasites, and poison baits help control rodents and predators such as foxes.

Pesticides are also important tools in the prevention and treatment of termite infestation in buildings. The control of biting insects such as mosquitoes, which can be a nuisance as well as vectors of disease, provides public health benefits and improves the quality of our lives. The use of pesticides in recreational areas such as sporting ovals, golf courses and parks has social, recreational and aesthetic benefits for our community.

Many exotic organisms such as weeds or feral species of animals can cause harm to the natural environment. Pesticide use can also help control environmentally harmful organisms, leading to the protection of native habitats and the maintenance of biodiversity.

Products for domestic and home garden use also provide benefits and can enhance the quality of our lives.

1.2 Environmental risks of pesticides

Clearly, pesticides can have economic, social, public health and environmental benefits. However, there are significant risks associated with pesticide use. Many pesticides are toxic to humans and other living things, so their inappropriate use can cause harm. For society as a whole, it is important that the benefits of pesticide use outweigh all the costs, and that any risks associated with their use are both acceptable and minimised as far as possible.

Inappropriate use of pesticides will detract from their benefits and can:

- cause illness or harm to humans who are exposed
- cause environmental nuisance such as noise and odour, which can reduce our quality of life

- harm non-target organisms including native, ornamental and agricultural plants and animals
- pollute land and water, which can damage ecosystem function and reduce biodiversity
- contribute to the development of resistance in pests.

Pesticide misuse may also present other risks, such as the contamination of agricultural produce, leading to trade problems and health risks.

1.3 Why is this guideline required?

Across our state large amounts of pesticides are used by many different types of users. When combined with the hazardous nature of pesticides, there is potential for misuse to cause significant harm to the environment and people. Harm may result unless care is taken at each stage of pesticide use, from planning, purchase, transport and storage through application to disposal.

In South Australia pesticides have been found in waterways and groundwaters, and historical contamination of soils is common around cattle and sheep dip sites. Pesticides have also caused fish and aquatic invertebrate kills in inland and estuarine waters. Bird deaths have been attributed to pesticides, and spraying to kill locusts has been shown to have an impact on other organisms. Damage to native vegetation, ornamentals and agricultural crops from pesticide misuse also occurs.

Therefore, while there can be significant benefits from pesticide use, with use in Australia generally being regarded as good, occasional misuse has the potential to cause significant harmful consequences for human safety, the natural environment and trade.

1.4 Scope of this environmental guideline

This guideline is relevant to all people using pesticides within the state of South Australia, including householders, lifestyle landholders, pest controllers, professional sprayers, primary producers, and local and state government employees.

The guideline covers the use of pesticides under all circumstances—by all levels of government and in agricultural, commercial and domestic situations including around the home and in the garden. It is important to note that in Australia the use of pesticides outside commercial agriculture is substantial. All users of pesticides, including home users, are required to meet their obligations under environmental and other legislation.

1.5 Your responsibilities when dealing with pesticides

If you deal with pesticides you have a responsibility to ensure that your actions do not cause harm to the environment, other people or their property, or yourself. Complying with relevant legislation and following this guideline should reduce the risk of your actions causing harm.

1.5.1 Take a precautionary approach

Despite widespread pesticide use in South Australia, our understanding of the transport, persistence, degradation and environmental consequences of pesticides in the

Australian environment is limited. It is therefore appropriate that we all take a precautionary approach when using pesticides.

This precautionary approach is embodied in your 'general environmental duty', outlined in s25 of the *Environment Protection Act 1993* (the Act). Under s25 you have a responsibility to take all reasonable and practicable measures to avoid causing environmental harm (see section 3.2.1). When you deal with pesticides you also have a common law duty of care to ensure that no harm is done to yourself, any other person or their property.

1.5.2 Comply with relevant laws

You are required to meet your legal responsibilities under all other legislation related to pesticides. Understanding and complying with the laws that govern pesticides is an important step towards achieving environmentally safe use. You are required to comply with all laws that apply to the storage, transport, application and disposal of pesticides. The legal framework regulating pesticides in South Australia is summarised in section 3 and the specific requirements of legislation are detailed in the guideline where relevant.

1.5.3 Follow sound environmental principles and undertake 'best practice'

Complying with the law is the first step in achieving best practice. In addition to compliance, there are a number of important principles that will lead to environmentally sound pesticide use. These are summarised in section 4. You should keep these principles in mind whenever you use pesticides—following them will reduce the risk of environmental harm.

Following Australian Standards will also encourage best practice in pesticide management. Relevant Australian Standards are listed in section 9.2.

Many commercial operators, including primary producers, have developed environment management systems (EMSs) which incorporate environmental risk management into operational procedures. They also use approaches such as integrated pest management (IPM) to manage pest problems. The EPA encourages the use of these approaches—not only do they have commercial benefits, but under these systems sound environmental outcomes become a routine objective of pesticide use. See sections 6.1.5 (EMS) and 6.1.3 (IPM) for further information on these topics.

There are also many industry-developed codes of practice and guidelines on pesticide use which include topics such as EMS and IPM. Contact your industry representative body for information on industry codes.

1.5.4 Identify relevant safety information

All pesticide users should familiarise themselves with the relevant safety information of the products they plan to use.

There are three main sources of information on the safe use of pesticides, targeted at different aspects of pesticide use. Pesticides purchased for domestic pest control may provide the necessary information on safety, use and disposal on the product label or on a leaflet, pamphlet or booklet included with the product (see sections 5.8.2 and 6.4.6 for further information).

Commercial pesticide users must also possess the relevant material safety data sheets (SDS) for each product they possess. These documents are prepared by the manufacturer and provide information on the physical, chemical and biological properties of the product along with its health and physical hazards (see section 6.3 for further information). SDSs for pesticides can be obtained from the product's manufacturer, or from the distributor if it is sold in quantities greater than 30 kilograms or 30 litres.

The poison schedule (see section 3.8) classifies the toxicity of substances and provides a heading that highlights the degree of possible health hazard implications of using that product. See section 8.2 for further details on this safety information.

2 WHAT ARE PESTICIDES?

Pesticides are substances or organisms used to eliminate, incapacitate, modify, inhibit growth of or repel pests. They can be natural or synthetic chemicals, mixtures of these, or living organisms that act as biological control agents.

A pest is a living organism that degrades the health, value, utility, condition or amenity of another organism, a structure or a place. Pest organisms can be plants, fungi, algae, vertebrate or invertebrate animals, or micro-organisms such as bacteria, moulds, slimes and fungi.

Pesticides may be single substances or mixtures of substances of the following types:

Algaecides (e.g. copper sulphate and swimming pool disinfectants)—prevent, eliminate or suppress algal growth.

Animal dips and sprays—control external parasites on animals. These include flea powders and liquids used externally. (Products such as injections and tablets that are applied internally are classified as veterinary products, not pesticides.)

Antifouling paints—discourage living organisms from attaching to or growing on boats and structures submerged in water.

Bactericides—destroy, suppress or prevent the spread of bacteria. Examples include swimming pool disinfection products and chemicals used to control black spot (bacterial blight) on plants. (Disinfectants for household and industrial use are not pesticides.)

Baits—attract and control pests including vertebrate animals such as foxes and rabbits, or invertebrate animals such as cockroaches, ants and snails.

Biological agricultural products—are pesticides with an active constituent that is a living organism or is derived from a living organism. The APVMA defines four main types of biological agricultural products¹:

- biological chemicals such as pheromones, hormones, growth regulators, enzymes and vitamins
- extracts including plant extracts and oils
- microbes including bacteria, fungi, viruses and protozoa
- living organisms including microscopic insects, plants and animals and some genetically modified organisms.

Defoliants—cause the leaves or foliage to drop from a plant.

Desiccants—artificially accelerate the drying of plant tissue.

Fungicides—prevent, destroy or suppress fungi. They are often used to control mould on fruit trees and grape vines.

Herbicides—destroy, suppress or prevent the spread of a weed or other unwanted vegetation.

¹ For further information see the APVMA's *Guidelines for the registration of biological agricultural products* www.apvma.gov.au/publications/guidelines/docs/bioagprod.pdf.

Insecticides—destroy, repel, suppress or generally prevent infestations or attacks by insects. Fly sprays and surface sprays are insecticides. Termiticides are a group of insecticides that are used on termites. While mites and spiders are arachnids, not insects, the products used to control them, especially in domestic situations, are described as insecticides. Miticides are products specifically used to control mites.

Molluscicides—prevent, destroy, repel or suppress molluscs, such as garden snails.

Nematocides—prevent, destroy, repel or suppress nematodes (also known as roundworms).

Plant growth regulators—accelerate or retard the rate of growth or rate of maturation, or alter the behaviour of ornamental or crop plants (not including fertilisers).

Post-harvest fruit dips and sprays—are applied after harvest to prevent rotting and mould on fruit and vegetables during storage. They may contain bactericides and fungicides.

Preservatives (e.g. copper chrome arsenate (CCA) and creosote)—prevent attack by pests, and are often used to protect timber.

Repellents—repel rather than destroy pests. Personal insect repellents used to discourage biting insects like mosquitoes fall into this category.

Rodenticides—control rodents such as rats and mice.

2.1 The two classes of pesticide

For the purposes of this guideline, pesticide products fall into two groups based on a division created by the national regulator of agricultural and veterinary chemicals, the APVMA:

- agricultural and commercial products (agricultural and commercial)
- home garden and domestic pest control products (home and garden).

Both groups of products are required to undergo assessment and registration by the APVMA before they can be used in Australia.

2.1.1 Agricultural and commercial pesticides

According to the APVMA, agricultural and commercial pesticides:

- are designed for use by professional operators or primary producers
- are generally only available through specialist outlets
- are often sold in large volume containers and in concentrated form
- may be highly toxic and include Schedule 7 poisons (see section 3.8 for information on poison scheduling)
- are possibly a significant threat to the environment, international trade access and human health
- have specific label instructions covering pest and crop suitability, the situations under which they can be used, and the appropriate methods of application and disposal. Many of these label instructions are mandatory.

2.1.2 Home garden and domestic pest control products

Home garden products—include pesticides that are available to the public at normal retail outlets. They are for use on vegetables, fruit trees, ornamentals, lawns and other areas around private dwellings for the control of diseases, insect pests and weeds as well as snails, slugs and rodents.

Domestic pest control products—include pesticides that are primarily used inside private dwellings to control common insect pests such as cockroaches, ants, spiders, silverfish, flies, mosquitoes and fleas.

According to the APVMA, home and garden pesticides:

- are either exempt from poison scheduling or are Schedule 5 or Schedule 6 poisons. They cannot be Schedule 7 poisons (see section 3.8 for information on poison scheduling).
- may be sold in smaller packages than agricultural and commercial pesticides
- have label instructions that are often of a more general nature
- may contain lower concentrations of active ingredients than agricultural and commercial pesticides.

Note that pesticides used in domestic situations by pest management technicians, such as those to control termites or fruit fly, are classified as agricultural and commercial pesticides, not home and garden. Similarly, if a householder or lifestyle landholder purchases and uses an agricultural and commercial pesticide, even for a non-commercial application, the rules for agricultural and commercial pesticides apply.

The classification of these two groups of products has only been in place since 1992 so this distinction may not hold for older products. If you have any older home products purchased before 1992, be careful—they may be very dangerous and present a significant risk to your safety and the environment. They may have degraded over time and not be effective for the purpose stated on the label, but this does not mean that they are safe; they may also have been deregistered. See section 5.9.2 for information on disposal of unwanted or unregistered pesticides.

2.2 What about organic and natural products?

There are popular misconceptions that 'natural' or 'organic' products are entirely safe or always safer than synthetic alternatives. Some natural or organic products may have environmental and safety advantages over synthetics but many can be toxic to humans and harmful to the environment.

Natural or organic pesticides, including those made from pyrethrum, garlic, tea-tree oil or eucalyptus oil, are subject to the same regulation as synthetic pesticides.

Commercially available products of this type can only be used if they are registered by the APVMA. If you are using these products you must comply with the specific requirements of the guideline (see section 3), as you would for synthetic pesticides.

If you make or use home remedies or preparations that fit within the definition of a pesticide (see section 2), you are responsible for ensuring that you use them safely and do not cause environmental harm. Use of these substances is subject to the relevant provisions of the Act and Environment Protection Policies.

3 SUMMARY OF PESTICIDE REGULATION IN SOUTH AUSTRALIA

Understanding and complying with the laws that govern pesticides is an important first step towards achieving environmentally safe use. The regulation of pesticides is complex because five government bodies administer many pieces of legislation. The seven major areas of pesticide regulation in South Australia are summarised in table 1.

In a cooperative agreement with the states and territories, the Commonwealth regulates the pesticides available for use in Australia up to the point of retail sale. This is done through the National Registration Scheme (NRS) for agricultural and veterinary chemicals. The states and territories are then responsible for regulating all aspects of pesticide use after the point of retail sale.

Table 1 Organisations responsible for legislation and regulation of pesticides in South Australia

Issue	Organisation	Legislation	Contact
Commonwealth regulation, review and registration of all pesticides used in Australia	APVMA	<i>Agricultural and Veterinary Chemicals Code Act 1994</i> (and six other Acts, see section 9.5 for details)	(02) 6210 4701 www.apvma.gov.au contact@apvma.gov.au
State environment protection and waste management	EPA	<i>Environment Protection Act 1993</i> and relevant Environment Protection Policies	SA metro area: (08) 8204 2000 SA country (Freecall): 1800 623 445 www.epa.sa.gov.au epainfo@epa.sa.gov.au
State control of use of agricultural and veterinary chemicals, including pesticides	PIRSA Rural Chemicals Program	<i>Agricultural and Veterinary Products (Control of Use) Act 2002</i> and <i>Agricultural and Veterinary Products (Control of Use) Regulations 2004</i>	(08) 8226 0549 www.pir.sa.gov.au/ruralchem pirsa.ruralchemicals@saugov.sa.gov.au
Regulation of dangerous substances including transport and storage	SafeWork SA	<i>Dangerous Substances Act 1979</i> and <i>Dangerous Substances Regulations 2002</i>	1300 365 255 www.eric.sa.gov.au help@safework.sa.gov.au
Workplace health and safety	SafeWork SA	<i>Work Health and Safety Act 2012</i> and <i>Work Health, and Safety Regulations 2012</i>	1300 365 255 www.safework.sa.gov.au help@safework.sa.gov.au
Public and environmental health issues	DH Environmental Health Service and local government	<i>Public and Environmental Health Act 1987</i>	(08) 8226 7100 www.dh.sa.gov.au/ public.health@health.sa.gov.au or your local council
Licensing and regulation of	DH	<i>Controlled Substances Act</i>	(08) 8226 7100

Issue	Organisation	Legislation	Contact
Commercial pesticide operators including aerial sprayers	Environmental Health Service	1984 and <i>Controlled Substances (Pesticides) Regulations 2003</i>	www.dh.sa.gov.au/ public.health@health.sa.gov.au

The aims and key requirements of each area of pesticide regulation are described here. Complying with the legal provisions of pesticide use will tend to reduce the risk of environmental harm, as well as promote safer use. Further information on this legislation can be obtained from the relevant government bodies (see table 1 for details). For information on the availability of the following legislation see [section 9](#).

3.1 Commonwealth registration of pesticides

The APVMA regulates the import, manufacture, registration, packaging, labelling, distribution and retail sale of pesticides in Australia. This is done according to the *Agricultural and Veterinary Chemicals Code Act 1994* (AGVET code) and the *Agricultural & Veterinary Chemicals Administration Act 1994*. All pesticides, including those for home garden use (e.g. weed killer) and domestic use (e.g. fly spray) fall under the scope of this Act.

The APVMA assesses new and modified products to ensure that when used as directed they are safe and effective, and to reduce the risk of adverse effects on people, the environment and trade. Once a pesticide has been assessed and the label instructions determined, it may be registered for use in Australia.

It is illegal to supply an unregistered pesticide or a pesticide without an approved label (s78 and s80 of the AGVET code).

Under limited circumstances the APVMA may provide a permit for the use of an unregistered pesticide or the use of a registered pesticide in a way that contravenes the label instructions. For more information on permits see section 6.4.7. Further information is available from the APVMA (for contact details see Table 1).

3.2 Protection of the environment

In South Australia the EPA administers the Environment Protection Act and various Environment Protection Policies (EPPs). This legislation controls the pollution of the environment, including pesticide misuse, and the management of wastes, including pesticide wastes. The Act gives the EPA the power to order individuals to stop activities that actually harm, or may potentially harm, the environment (s93) and to place Clean-up Orders (s99) on polluters.

3.2.1 General environmental duty under the Environment Protection Act

Your duty of care for the environment is embodied in the general environmental duty:

A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm or nuisance (s25 of the Act).

For example, directly applying pesticides to waters or onto other people's property, or allowing pesticides to enter surface waters or groundwaters or escape from your property, may cause harm to the environment, or to other people and their property.

Harm may arise whether the escape is due to direct application or spray drift, or is by movement through soils or in waters, both during or at any time after application.

The EPA considers that any such release may be a breach of your general environmental duty² unless you have taken all reasonable steps to prevent such escape. Failure to comply with this duty is not an offence but compliance may be enforced with an Environment Protection Order (EPO). Failure to comply with an EPO is an offence.

3.2.2 Environmental harm

Causing environmental harm is an offence³.

A person who by polluting the environment causes serious or material environmental harm is guilty of an offence. Also, a person who causes an environmental nuisance by polluting the environment intentionally or recklessly and with the knowledge that an environmental nuisance will or might result is guilty of an offence (s79, s80 and s82 of the Act).

The different levels of harm—serious, material and environmental nuisance—are defined in section 8.2. If your actions lead to a situation where serious or material harm occurs, or threatens to occur, you are required by law to report it to the EPA. See section 7.2 for further information on the requirements for reporting offences. Examples of activities that may cause environmental harm due to pesticides include allowing or causing:

- pesticides to enter stormwater systems, inland waters, groundwaters, estuarine or marine waters
- pesticides to pollute soils outside your own property
- impacts on non-target organisms, including plants or animals, and damaging ecosystem function
- harm to neighbours' gardens or crops due to spray drift
- excessive noise during pesticide application or subjecting neighbours to spray drift that causes discomfort, illness or nuisance due to odour, irritation or toxicity (see section 6.9.1 for further information).

² You are allowed to use a pesticide that is registered by the APVMA for use in or around waters to treat pests in the vicinity of the waters. You must not exceed the application concentration or rate specified on the label. Note that pesticides applied around waters may have significant impacts on non-target organisms, even if the pesticide is approved for use in these areas. Only undertake application of pesticides in such areas with the utmost care. Careless application of pesticides in and around waters may breach your general environmental duty even if that pesticide is registered for use in such situations. For further information see the EPA's environmental guideline for pesticide use by urban and rural lifestyle landholders (in preparation; call the EPA for information).

³ s84 of the Act states that it is a defence against a charge of environmental harm if an act of pollution only causes harm on your own property or someone else's property with their permission. This effectively means that polluting your own land is allowed. This defence does not extend to waters—pollution leading to environmental harm in surface waters or groundwaters under your own property is an offence. In addition, this defence does not extend to your general environmental duty. It may also be an offence to harm native vegetation on your own property under the *Native Vegetation Act 1991*. In any case you should consider the consequences of contaminating your own land (see section 4.4 for further information).

3.2.3 General obligation under the Water Quality Policy

The EPA also administers the *Environment Protection (Water Quality) Policy 2015* (Water Quality Policy). Under clause 8 & clause 9 of this policy you have a general obligation to avoid discharge into waters.

A person must, in taking all reasonable and practicable measures to prevent or minimise environmental harm resulting from undertaking an activity that pollutes or might pollute waters (in compliance with the general environmental duty), comply with at least the following requirements (to the extent that they are applicable)

'Waste' includes any substance that is left over, surplus or an unwanted by-product from any business or domestic activity, whether the substance is of value or not. Therefore, any pesticide that is unwanted, left over after application, spilled, or escapes from the target area during or after application, or is contained in washings, is a waste. Pesticide breakdown products are also wastes.

'Waters' under this policy means all surface and underground waters including irrigation drainage channels, public stormwater systems and watercourses that are dry. A watercourse is defined as a blue line on a 1-in-50,000 map.

3.2.4 Contamination of waters

The Water Quality Policy also makes it an offence to contaminate waters with pesticides.

(1) A person must not discharge a class 1 pollutant into any waters or onto land in a place from which it is reasonably likely to enter any waters (including by processes such as seepage or infiltration or carriage by wind, rain, sea spray or stormwater or by the rising of the water table).

Mandatory provision: Category B offence.

(2) Nothing in subclause (1) prevents—

(a) the lawful use of a pesticide or herbicide that has been manufactured for use in relation to waters provided it is used at a concentration not exceeding a maximum concentration specified by the manufacturer or by law;

or (this means you will not be prosecuted if you have used the product according to the label)

The movement of pesticide wastes into waters breaches this obligation even if those waters are on your own property. Failure to comply with this obligation does not constitute an offence but compliance may be enforced with an EPO. Failure to comply with an EPO is an offence.

Practically, this means it is an offence to cause the concentrations of pesticides in any waters⁴ in the state to reach a concentration where they can be detected by a test approved by the EPA.

The Water Quality Policy also places an obligation upon people not to discharge or deposit listed pollutants into waters or onto land where it is likely to enter waters. Agricultural chemicals, including pesticides, are a listed waste under the policy.

This provision does not apply to the lawful use of a pesticide which is manufactured for use in relation to waters and used at a concentration not exceeding the maximum concentration specified by the manufacturer or by law.

3.2.5 Pesticide wastes

The Act also addresses the production, transport, reception, storage, treatment and disposal of waste, including pesticide waste. Surplus or discarded pesticide, including left-over product and pesticide washings, becomes a listed waste. Producers of listed wastes may require an EPA licence; however, people who produce pesticide wastes as a consequence of a domestic activity, agriculture or horticulture are exempt from licensing requirements. See sections 5.9 (home garden and domestic pest control products) and 6.7 (agricultural and commercial products) for advice on the legal requirements of dealing with pesticide wastes.

There are certain requirements for the disposal of waste CCA-treated timber, including a specific directive that it should not be burned. Waste CCA timber products should be delivered to a person/body licensed to receive such waste. For more information refer to EPA Guideline *EPA 572/04 Copper chromated arsenate (CCA) timber waste—storage and management* www.epa.sa.gov.au/xstd_files/Waste/Guideline/guide_cca.pdf.

⁴ Currently, by default, all waters in South Australia have aquatic ecosystem values and all inland surface waters and groundwaters have drinking water values. The environmental values of particular bodies of water may be changed following the procedure in s32 of the Act. Any future changes will be detailed in the Water Quality Policy.

3.3 Control of pesticide use

In South Australia the main legislation controlling the use of agricultural and commercial pesticides is the *Agricultural and Veterinary Products (Control of Use) Act 2002* (AGVET Control of Use Act) and the *Agricultural and Veterinary Products (Control of Use) Regulations 2004* (AGVET Control of Use Regulations). This legislation is administered and enforced by PIRSA.

Compliance Orders can be issued under s30 of the AGVET Control of Use Act to ensure compliance with the provisions of that Act.

It is an offence to possess or use an unregistered pesticide unless you have a permit (s6 of the AGVET Control of Use Act).

The easiest way to determine if a product is registered is to search the APVMA online database at www.services.apvma.gov.au/PubcrisWebClient/welcome.do. If a product does not appear on this database it is not currently registered. This database also provides the label instructions and other information for registered products. You can also call the APVMA on (02) 6272 5852 or e-mail EnquiryLine@apvma.gov.au for advice on the registration status of products.

If a product is deregistered, there will be notification in the State Government Gazette www.governmentgazette.sa.gov.au and the APVMA generally conducts public information campaigns to alert users.

If the registration of a pesticide in your possession lapses or is withdrawn, you have a maximum of four years to use or dispose of it. However, if the product presents a risk to the environment, trade or health, PIRSA may shorten the period you have to get rid of remaining stocks (s6 of the AGVET Control of Use Act).

The [PIRSA inFINDER chemical database](#) is another useful resource that shows the registration status of chemicals. It also provides agricultural and veterinary product label images, safety data sheets (SDS) and a dangerous goods management tool. Copies can be purchased from PIRSA: telephone (08) 8226 0405 or e-mail pirsa.infinder@saugov.sa.gov.au.

Home and garden pesticides are subject to the registration requirements above. Although they are exempt from the mandatory instructions (s7) and storage container (s8) provisions of the AGVET Control of Use Act, the general duty provision does apply (see s5.3.1). These exemptions do not apply if home garden products are used to treat produce that is to be traded.

3.3.1 General duty under the AGVET Control of Use Act

The general duty under the AGVET Control of Use Act covers a number of areas but concerning pesticides and the environment, it states that:

A person must, in using or disposing of an agricultural chemical product⁵, fertiliser or prescribed veterinary product, take all reasonable and practicable measures to prevent or minimise:

- *actual or potential contamination of land outside the target area*
- *actual or potential contamination of animals or plants on land outside the target area*
- *actual or potential harm to the health or safety of human beings whether within or outside the target area*
- *other unintended actual or potential environmental harm whether within or outside the target area (s5 of the AGVET Control of Use Act).*

Failure to comply with this duty is not an offence, but compliance may be enforced with a Compliance Order. Failure to comply with an order is an offence.

3.3.2 Label instructions and storage

The AGVET Control of Use Act defines standards for the types of containers and labelling required for storage of pesticides (s8). It also makes following mandatory label instructions on the use and disposal of a pesticide a legal requirement (s7). The AGVET Control of Use Regulations (s3) define what types of label instructions are mandatory. See the relevant parts of section 6 (Agricultural and commercial pesticides) for details.

PIRSA's Rural Chemicals Program can provide further guidance on various aspects of pesticide use (for contact details see Table 1).

⁵ Most of the substances defined as pesticides in this guideline are 'agricultural chemical products' under the AGVET Control of Use Act. A few pesticides are 'prescribed veterinary products', such as externally applied dips or sprays for the control of external parasites on animals. This guideline does not apply to the majority of veterinary products and it does not apply to fertilisers.

3.4 Public and environmental health

In South Australia the DH Environmental Health Service and local government administer the *Public and Environmental Health Act 1987*. Offences under this Act include creating a risk to human health, emitting offensive material or odours, discharging pesticide wastes in a public place, and polluting a water supply with pesticides. Further information is available from the DH Environmental Health Service (for contact details see Table 1).

3.5 Licensing of pest controllers and commercial sprayers

The DH Environmental Health Service administers the *Controlled Substances Act 1984* (Controlled Substances Act) and *Controlled Substances (Pesticides) Regulations 2003* (Controlled Substances Pesticide Regulations). South Australian pest control companies, pest control technicians and aerial spray operators are licensed under this legislation.

A person must not carry on a pest control business without an appropriate licence, and a person must not perform pest control work in the course of a pest control business except as authorised by a pest management technician's licence (s6 of the Controlled Substances Pesticide Regulations).

If you apply pesticides for profit or reward, including in the course of other businesses such as landscape gardening, you may also require a licence. See section 6.8.2 for further information on licensing requirements. The regulations also place conditions on pest controllers and technicians in the following areas:

- following label instructions, codes and standards (section 6.4.8)
- transport and storage (section 6.4.5)
- record keeping (section 6.8.6)
- notification of spills (section 9.2.3).

Further information is available from the DH Environmental Health Service (for contact details see Table 1).

3.6 Occupational health and safety

SafeWork SA, a State Government agency that is part of Department of Premier and Cabinet (DPC), administers the *Work Health and Safety Act 2012 (SA) 6* (WHS Act) and the *Work Health and Safety Regulations 2012 (SA)* (WHS Regulations) in South Australia. The Act aims to secure the health, safety and welfare of people at work by eliminating workplace risks at their source. It also protects the public against risks to health or safety arising from the activities of people at work. Misuse of pesticides in a workplace may compromise the health and safety of individuals in a workplace or in the vicinity of a workplace.

3.6.1 General provisions of the WHS Act

The WHS Act places general obligations upon employers, self-employed people, workers and all other people present in a workplace.

A workplace is any place (including any aircraft, ship or vehicle) where an employee or self-employed person works, and includes any place where such a person goes while at work (s4 of the WHS Act).

If you use pesticides in the workplace, you are required to consider your obligations under s19 to s25 of the WHS Act, including the following:

- *An employer must ensure so far as is reasonably practicable that employees, while at work, are safe from injury and risks to health. In particular the employer must provide and maintain so far as is reasonably practicable a safe working environment, safe systems of work, adequate facilities and appropriate training and supervision.*
- *An employee must take reasonable care to protect their own health and safety at work and avoid adversely affecting the health and safety of others.*
- *An employer or a self-employed person must take reasonable care to protect his or her own health and safety at work (s19 to s25 of the WHS Act).*

Furthermore, the WHS Regulations place specific requirements upon persons using hazardous substances in a workplace and many pesticides are hazardous substances. To determine if a pesticide is a hazardous substance, see the product's Safety Data Sheet (SDS). Section 6.3.3 provides further details on dealing with hazardous substances.

Breach of mandatory provisions of this legislation can result in significant fines and imprisonment. Further information is available from SafeWork SA (for contact details see Table 1).

3.7 Dangerous substances legislation

SafeWork SA also administer the *Dangerous Substances Act 1979* (Dangerous Substances Act) and the *Dangerous Substances Regulations 2002* (Dangerous Substances Regulations) in South Australia, which regulate the keeping, handling, transporting, use and disposal of dangerous substances.

Dangerous substances are those which are toxic, corrosive, flammable or otherwise dangerous. Many pesticides are Class 6 (toxic) or Class 3 (flammable) dangerous substances. If a pesticide is a dangerous substance the SDS will specify the dangerous goods class and packing group that a pesticide belongs to (see section 6.4.4 for further information on dangerous substance classification including packing groups).

The 6th edition of *The Australian Dangerous Goods Code* (ADG code) provides information on the mandatory technical requirements and guidelines for the land transport of dangerous goods.

3.7.1 General duty under the Dangerous Substances Act

The general duty under s11 of the Dangerous Substances Act states that:

A person must, in keeping, handling, conveying, using or disposing of a dangerous substance, or in transporting dangerous goods, take such precautions and exercise such care as is reasonable in the circumstances in order to:

- *avoid endangering the health or safety of any person (including himself or herself), or the safety of property; and*
- *prevent the risk of environmental harm (s11 of the Dangerous Substances Act)*

Substantial penalties, including imprisonment, can be imposed under this provision. Further information is available from SafeWork SA (for contact details see Table 1).

3.8 Poison scheduling

Poison scheduling is the system used to classify substances based on their potential health risks. The National Drugs and Poisons Schedule Committee assesses substances and lists those that are classified as poisons in the *Uniform Poisons Standard*. States then enforce this classification—the relevant legislation in South Australia is the *Controlled Substances (Poisons) Regulations 1996*.

The heading on a product indicates which poison schedule it belongs to—you can also obtain this information from the SDS. There are four schedules applicable to pesticides:

Unscheduled substances are not considered poisons. However, they may be capable of causing minor adverse effects to human beings in normal use. They may have the heading 'KEEP OUT OF REACH OF CHILDREN' on the label.

Schedule 5 (S5) poisons have low toxicity or a low concentration and pose a low to moderate hazard. They are capable of causing only minor adverse effects to human beings in normal use and require caution in handling, storage or use. They have the heading 'CAUTION—KEEP OUT OF REACH OF CHILDREN' 'Read Safety Directions Before Opening Or Using' on the label.

Schedule 6 (S6) poisons have moderate to high toxicity which may cause death or severe injury if they are ingested, inhaled or come in contact with the skin or eyes. They have the heading 'POISON—KEEP OUT OF REACH OF CHILDREN' 'Read Safety Directions Before Opening Or Using' on the label.

Schedule 7 (S7) poisons are substances with high to extremely high toxicity which can cause death or severe injury at low exposures. They require special precautions in their manufacture, handling or use and are too hazardous for domestic use or use by untrained persons. They have the heading 'DANGEROUS POISON—KEEP OUT OF REACH OF CHILDREN' 'Read Safety Directions Before Opening Or Using' 'Can Kill if Swallowed' on the label.

Home and garden pesticides cannot be S7 poisons. There are restrictions on the purchase and use of S7 pesticides (see section 6.8.3 for further information).

Always exercise care and follow label instructions when using pesticides regardless of scheduling. Using a product of any schedule contrary to label instructions may potentially lead to serious health and safety risks.

4 KEY PRINCIPLES FOR ENVIRONMENTALLY SOUND PESTICIDE USE

Understanding and complying with the laws that govern pesticides is an important first step towards achieving environmentally safe use. In addition to complying with the law, the EPA also believes that there are a number of important principles that will lead to environmentally sound pesticide use. You should keep these principles in mind whenever you use pesticides—following them will reduce the risk of environmental harm.

4.1 Follow the label instructions

The APVMA sets out label instructions to ensure that pesticides are used effectively and do not have a negative impact upon the environment, health, safety and trade. Therefore, make sure you understand and follow the label instructions on pesticides. This will tend to reduce the chances of environmental and other harm arising from your pesticide use.

4.2 Always consider the circumstances when applying pesticides

It should be recognised that while following label instructions is a fundamental part of responsible pesticide use, it will not necessarily eliminate all risk of environmental harm. It is also possible to breach other laws even if you comply with label instructions. This is because label instructions do not cover the full range of circumstances under which pesticide use will occur. Always consider the circumstances when dealing with pesticides.

4.3 Only apply pesticides to the target area

You have a fundamental responsibility to ensure that the pesticides you use do not move beyond your targeted application area. By using pesticides in a manner that achieves this principle you will be taking a significant step towards eliminating potential impacts on other people and the environment.

4.4 Consider the potential of contamination of your own land

Contamination is defined as the addition of any chemical substance (or waste) to land or water that increases the concentration of the substance above background levels and represents, or potentially represents, an adverse impact to human health or the environment.

Pesticides may be applied to land for agricultural use and a range of other legitimate purposes. However, you should consider the potential for contamination of your land, not only for the current use of the land but also for potential future uses. The consequences of contamination for alternative uses, such as different crops, residential development, child-care centres or schools, may be substantial.

Contamination of your own land may occur both within and outside your target area. Remediation of contaminated land can be difficult and costly. This may reduce the value of your property and may present difficulties if you choose to sell it.

4.5 Communication

Pesticide users have a responsibility to use pesticides in a manner that does not unreasonably interfere with the quality of life, health or property of other people. Effective communication is a good way to minimise conflict between pesticide users and neighbours; however, it is often overlooked. Neighbours may feel that pesticide application causes noise, odour, property damage and health problems. While these perceptions may not always be justified, communication can help to clarify what real risks and inconvenience arise from your pesticide application. Many neighbours will be more understanding if you provide information on the type of application, and its timing and purpose.

In some cases it may not be feasible to contact all neighbours but if possible this contact may well prevent problems, and prevention is far better than having to deal with complaints and poor relations that in the worst case could lead to legal action.

5 HOME GARDEN AND DOMESTIC PEST CONTROL

5.1 Effective management of pest problems around the home

Over 90% of home owners use pesticides of some type. On average, home owners are reported to use more pesticides per hectare than farmers, which suggests that home owners tend to apply pesticides at higher than recommended rates in the home garden environment. This is supported by experience at the EPA's Watershed Protection Office, which suggests that Adelaide Hills residents are typically applying herbicides at about five times the recommended rate.

People using pesticides around the home will generally have less expertise and training than professional pest controllers and primary producers. Therefore, misuse and overuse of pesticides in domestic situations may well be common.

Remember that where the term 'pesticide' is used in this section it includes insecticides (e.g. fly spray), herbicides (e.g. weed killers) and fungicides. See section 2 for the definition of a pesticide.

5.1.1 The wide range of home garden pesticides

Home garden pesticides vary substantially in toxicity and the environmental and health risks they pose. They also have a diverse range of intended uses and are packaged and applied in many different ways.

Some home garden pesticides are designed for application onto the skin, such as personal insect repellents, or for use inside dwellings while they are occupied, such as aerosol fly sprays. These products are usually of lower toxicity to humans. Other products, such as cockroach baits, may contain chemicals like chlorpyrifos, which are more hazardous. Similarly, the active ingredients in garden products range from low toxicity chemicals, such as glyphosate, through to more hazardous substances like dimethoate and chlorpyrifos.

This section provides some general rules on managing pests in domestic situations as well as the use, storage and disposal of home garden pesticides. However, the variability in these products means that general rules will not apply to all types. For example, for some home garden pesticides, personal protective equipment (PPE) such as gloves and goggles may be wise, and in general you should avoid pesticide contact with your skin. Clearly though, gloves are not required for personal insect repellents which are designed to be applied to the skin.

5.1.2 Your responsibilities when using home garden products

Given the variable nature of these products, it is essential that you understand and follow the label instructions whenever you use a home garden pesticide. Where appropriate also follow the advice provided in this section.

There are also laws that you are required to comply with when using home garden products. See section 3 for further information on the regulation of pesticides in South Australia.

5.1.3 Home garden or agricultural and commercial—what kind of pesticide are you using?

Make sure that the pesticide you are using is a home garden product before assuming that this section of the guideline applies. Section 2.1 describes the difference between 'home garden and domestic products' and 'agricultural and commercial products'. If you have purchased your product from a supermarket or suburban hardware store it will almost certainly be a home garden product. If you have purchased it from an agricultural supply store you probably have an agricultural or commercial product. The manufacturer of the pesticide or the retailer who sold it to you should be able to tell you what category it falls into.

If you are uncertain what type of pesticide you have because you obtained it from a friend or neighbour, or it has been in storage for some time, contact the manufacturer for advice. If you cannot contact the manufacturer, make sure that it is still registered for use as it is illegal to use an unregistered product. See section 5.6.2 for further information on finding out if a product is registered.

If you are using an agricultural or commercial product, then section 6 of the guideline applies.

5.2 Health and safety when using pesticides around the home

When using pesticides always consider health and safety issues, and be careful during the transport, storage, preparation, application, clean-up and disposal of pesticide products and wastes.

Many pesticides are hazardous chemicals. Exposure can cause reactions in humans, ranging from irritation to severe illness or death. Exposure to some pesticides may also cause chronic problems that do not become apparent until some time after exposure. Therefore, the safest approach is to minimise your exposure to pesticides. However, it is important to note that some pesticides, such as personal insect repellents, are designed to be applied to the skin.

Poison scheduling can be used to help decide which pesticides to purchase and use (see section 3.8 for information on poison scheduling). If you have to use an S5 or S6 pesticide, make sure that you take appropriate precautions when storing and applying it.

Remember that home garden pesticides cannot be Schedule 7 poisons. There are restrictions on the purchase and use of S7 pesticides (see section 6.8.3 for further information).

Always exercise care and follow label instructions when using pesticides regardless of scheduling. Using a product of any schedule contrary to label instructions may lead to serious human and environmental health and safety risks.

5.2.1 Using pesticides on home produce—withholding periods

If you apply pesticides in the garden near or onto home produce such as fruit or vegetables, you may need to leave the produce for a period of time before you pick it. This is to ensure that the produce is not contaminated and is safe to consume. This is called the 'withholding period'.

Withholding periods are specified on pesticide labels. Examples of these statements include:

DO NOT PICK TOMATOES FOR 7 DAYS AFTER SPRAYING

DO NOT PICK EDIBLE PLANTS FOR 2 DAYS AFTER DUSTING

DO NOT PICK VEGETABLES FOR 1 DAY AFTER APPLYING PELLETS

DO NOT PICK CITRUS, CABBAGES, APPLES OR PUMPKINS FOR 5 DAYS AFTER SPRAYING.

Be aware that a single pesticide may have different withholding periods for different crops. Withholding periods are determined based on pesticide application at the rate and concentration specified on the label. Withholding periods may not be adequate if you apply chemicals at a higher rate than specified on the label. Do not apply pesticides at a higher rate than specified on the label.

5.2.2 Personal safety when using pesticides

Due to the variable nature of home garden products it is essential that you always read the label carefully and follow the instructions. Pay particular attention to the safety instructions.

- Avoid getting pesticides on your skin unless the product is designed for that purpose, such as with some personal insect repellents.
- Take care not to swallow pesticides, get them in your eyes, or inhale dust, spray or vapour from them.
- Always wear appropriate personal protective equipment if stated on the label.
- Remove protective clothing and then wash your hands with soap before eating, drinking, smoking or going to the toilet, and at the end of the job.
- Some pesticides are sold in, or need to be diluted in, flammable solvents. Handle these pesticides in a well-ventilated area and make sure there are no sources of ignition nearby when using them.
- Tell someone responsible if you feel ill during or after pesticide use, especially if you have been exposed to a pesticide, including by inhalation, skin contact or ingestion. Seek prompt medical attention or call the Poisons Information Centre on 13 11 26 as soon as possible, providing them with the names of the active ingredients in the pesticide.

5.2.3 Using pesticides where there is a risk to children, pets or other non-target organisms

Pesticide application in some locations carries a higher risk of poisoning. Avoid spreading around granules or pellets such as snail or rodent baits if there is a risk of accidental swallowing by young children or pets. If you use these products make sure you restrict access to the area. Be aware that spray residue can also be inhaled, ingested or absorbed through the skin.

- It is illegal to purchase, possess or use Schedule 7 pesticides ('DANGEROUS POISON') without a pest controller's licence or appropriate certified training. See section 6.8.3 for further information.

- When using Schedule 5 and Schedule 6 poisons, which will be labelled 'CAUTION' or 'POISON', around the home, ensure that the directions for use are carefully followed. Try to use products of a lower toxicity and avoid products with a long residual action.
- If you employ a pest controller, ask what types of chemicals they are using so you can maintain a safe environment after the pest controller is gone.
- If you have to use higher toxicity products, consider where and how you apply them. Place baits in secure locations or restrict access to areas where toxic sprays have been applied.

See the section 9.3 for details of texts that offer information on safer alternatives to pesticide use.

5.3 Do you really have a pest problem?

When considering pest control you should first ask yourself whether you really have a pest problem. In section 2 a pest was defined as:

'a living organism that degrades the health, value, utility, condition or amenity of another organism, a structure or a place.'

Clearly, some organisms, such as snails, mosquitoes, fleas, redback spiders, rats and mice, are undesirable pests. Where pests have the potential to cause discomfort, disease or property damage, pest control is certainly justified. However, there will be many other living things around the home and garden that do not present a significant risk to our health, property or wellbeing. Just because something is a bug, a spider or an insect, it does not mean it is a pest.

Whether an organism is a pest or not can also be influenced by its location and abundance. Many people feel uncomfortable with spiders inside their homes and under these circumstances pest control may be a wise option. In contrast, attempting to eliminate all spiders from a healthy garden is not only unwise, due to the value of spiders as predators of other pests, but it is also going to be very difficult. Wearing gloves while gardening is a far better option.

Other organisms, such as Portuguese millipedes, may be a mild irritation when present in low numbers but a significant problem when they are abundant. Pest control is not always about elimination of a pest—it may be sufficient to reduce its numbers to the point where it no longer causes problems. However, there are exceptions to this rule. For example, eliminating rodents or termites from the typical home is not only desirable but is generally possible.

So, always determine whether the organism in question is really a pest and if it is abundant enough to require control.

5.3.1 Preventing pest problems

If possible you should always aim to minimise pest problems in the first place. There are often alternatives to pesticide use around the home for both indoor and garden pest problems. Better planning can eliminate or reduce the need for pesticide use. The benefits of a preventative approach include fewer and less severe pest problems, lower chemical costs and less risk of harm to the environment or your health.

5.3.2 Consider professional help

Some pests are difficult to deal with and may require professional treatment. Termites are not only difficult to control, they may be managed best with treatments that only licensed pest management technicians are allowed to apply. Furthermore, the consequences of failed termite treatment are substantial. Bees and European wasps are also difficult to deal with, and trying to eliminate hives of these stinging insects presents a significant safety risk.

If you have a pest that you are not comfortable dealing with, or that requires specialised treatment, you could consider employing a licensed pest controller. Make sure the person who carries out your work has a pest management technician's licence and works for a licensed pest control business. Discuss the job thoroughly with them and make sure they are aware of the access children and pets have to the treatment areas. Satisfy yourself that they are capable of carrying out the job in a competent and safe manner. Good communication will lead to a better result with less chance of environmental or safety problems.

5.4 Preventing rodents and insect pests around the home

Problems with mice, rats, flies, cockroaches, termites and other pests can often be reduced or eliminated if you take sensible precautions, resulting in less pesticide use. However, if you do need to use chemical treatment, it is important to choose a product that is suitable for your pest and situation, while minimising environmental and human health risks. Local government can provide advice and assistance when dealing with pests around the home; contact your local council for further details.

5.4.1 Non-chemical options

Restrict pest access

- Properly fitting window and door screens in good repair is an excellent first step in preventing flies, mosquitoes and other pests from getting into your home.
- Block other areas of pest entry to the house. Gaps and holes can allow rodents or birds entry and provide them with a place to live. However, don't block ventilation or weep holes—if these features are used as points of entry for pests, consider covering them with mesh such as flywire.
- Termites are a significant threat to homes, even if you have chemical or physical barriers set up to stop them. Cracks in walls and foundations can provide access points. Any items in contact with walls, including living plants, timber and garden beds, can provide termites with access points and a way around barriers. Pergolas, verandahs or renovations can also bypass barriers and provide access points.
- Physical barriers can be used to keep pests ranging from snails to dogs and cats away from garden plants.

Remove sources of food, breeding areas and habitat

- Standing water is prime habitat for mosquito breeding. Features around your home that collect standing water include containers, tyres, gutters, self-watering pot plants and saucers. Gaps in rainwater tanks should be screened or blocked.

Ornamental ponds and garden water features can also support mosquitoes—where appropriate keep them stocked with fish.

- Seal rubbish bins properly to keep out flies, ants and rodents.
- Don't stack newspapers or cardboard in the home as this provides habitat for pests including cockroaches.
- Remove refuse from around your house as it provides rodents with shelter and breeding areas. Store all timber above the ground.
- Manage compost properly. Keep compost bins screened and do not compost meat, bones or dairy products as they will attract rodents. Turning compost heaps regularly and using lime can help reduce pest problems.
- Clean up fallen fruit and nuts from trees and harvest garden produce as it ripens. This reduces food available for rodents.
- Chicken coops and bird aviaries can be a source of food for rodents. Keep seed and pellets in sealed metal containers such as garbage bins. Use rodent-proof feeders and only supply food as it is needed. The same principles apply for other pet food stored in sheds or outside.
- Indoors, clean up food spills quickly. Store foods, especially grains and cereals, in airtight containers. Refrigerators provide pest-proof storage.

Physical control and traps

- The fly swat is a traditional and effective alternative to insecticide aerosols.
- Spring loaded and other types of rat and mouse traps can be effective in eradicating rodents. Trapping a rodent eliminates the chance of unpleasant odours when a poisoned animal dies in an inaccessible part of your home.
- Light traps can be effective in capturing millipedes and other insects, and baits may be used for some insects and other invertebrates.
- Pheromone tags will control codling moth.
- Sticky pads are useful for control of aphids, white fly, leaf miners and thrips.
- Correct mulching will help control weeds around shrubs and bushes.
- Use boiling water for controlling weeds around the patio, driveway and paths.
- Hygienic (clean and tidy) garage, shed and patio areas will help reduce the rodent population around the home and garden.

5.4.2 Choosing a pesticide for use in the home

First check the product label to determine if the product is suitable for your pest and appropriate for your situation and location of use. For example, don't buy a surface spray to control flying insects and don't use products designed for outdoor use indoors.

Remember the general principle 'only apply pesticides to the target area' (section 4.3). Try to use products that target the pests directly whenever possible. For example, options 1 to 4 below range from the most to the least targeted.

1. Cockroach baits target pests directly over an extended period with a contained pesticide that can be easily removed.
2. Aerosol space sprays can be applied directly to the target pest, although more pesticide is released off-target than with baits.

3. Surface sprays are generally more widely released to the environment than the above treatments and have a longer residual action.
4. 'Bomb' products release pesticides with a substantial residual action across a whole room.

If you are using bomb products as a preventive tool, you should carefully consider whether the pest problem you have justifies carpeting a whole room with pesticide. Other products or approaches might provide a better option. Preventive measures such as removing habitat and food sources (see section 5.4.1) will address the source of the problem, rather than the symptoms, resulting in more effective management. In combination with baits, you will get a far more targeted solution.

Also consider the residual effect of a pesticide. Products with longer residual action are potentially active in the environment for longer. This is a good reason for choosing control methods like baits which contain the chemical effectively. In contrast, 'bomb' products spread more residual chemicals more widely.

5.5 Managing weeds, insects, other pests and diseases in the garden

In environments such as gardens, insects, spiders and other bugs occur naturally and many are beneficial. There will often be a balance between beneficial organisms and pests which may maintain many pests at an acceptable level.

Effective pest control in the garden does not necessarily mean eradication of a pest. Many organisms that are pests at high numbers are harmless when present in low numbers. Determine whether the organism you are concerned about is really a pest. Insects, spiders and other bugs are found naturally in gardens and many are beneficial. Do not kill them without good reason.

If you do have a pest, there are often alternatives to chemical control or ways you can reduce the need for pesticide use. You may achieve the best results when you combine chemical and non-chemical methods.

Another thing to consider is whether your problem is actually caused by a pest. Some plant ailments may be caused by other factors, like too much or too little water, poor soil nutrition or drainage, or the wrong location or climatic conditions for the plants you have chosen.

5.5.1 Non-chemical options

Prevent infection

- If you bring soils or manures onto your property, be aware that this may introduce weed seeds from other locations. If you buy soils, manures or composts from a commercial supplier, check to make sure they are weed free.
- Clean up fallen fruit and nuts from trees and harvest garden produce as it ripens. This reduces the food available for pests.

Physical control

- Exclusion or physical removal of some pests can be very effective. You can collect snails and other garden pests by hand. Physical barriers can keep many pests away from plants.
- Weeds can be removed manually, especially when they are smaller. Removing weeds before they go to seed helps prevent reinfestation.
- Application of mulch or use of weed mats will make it harder for weeds to establish.

Give your plants the best chance against pests

- If possible, choose pest resistant plant varieties suited to the climatic conditions in your area.
- Rotating crops can minimise problems. Some plants, especially tomatoes, are more likely to suffer diseases when planted in the same place year after year. Alternating varieties may also help in these situations.
- Mulching, along with the correct rate of watering and appropriate use of fertilisers, will promote healthy plants that will be more resistant to pest problems. Note that excessive watering and use of fertilisers may lead to weaker plants and increase pest problems.

5.5.2 Choosing a pesticide for use in the garden

If you need to use chemical control in the garden, try to identify the pest correctly. This will allow you to choose the best option for control. Garden centres may be able to provide advice on your pest and the treatment options. In addition, animal and plant control boards can provide specific information for the treatment of certain pests. The web sites of the regional control boards can be found at

www.naturalresources.sa.gov.au/home.

- Check the product label to determine if the product is suitable for your pest or weed and appropriate for your situation and location of use.
- Remember that pesticide use may kill beneficial organisms such as worms and natural predators. Try to specifically target the pest rather than broadly applying a pesticide. If a pesticide kills the naturally occurring predators in your garden you may get a short-term reduction in pest numbers, but in the long term pest numbers may increase.
- Consider the residual effect of the product. Do you really need to apply a herbicide to the driveway or patio that lasts a year? Could you get effective control with manual weeding or the application of a product such as glyphosate that has less residual effect?

5.6 Purchasing a pesticide for home or garden use

5.6.1 What to look for when buying a pesticide product

- Only buy a pesticide with an intact label in a properly sealed and undamaged container.
- If possible pick the product with a lower toxicity to humans and the environment, and a lower residual effect. Make sure you have or obtain any personal protective equipment (PPE) specified on the product label.

- You should not buy more than you need for the foreseeable future. Storing and disposing of unwanted pesticides can be hazardous for you and the environment. There is also evidence that some ready-to-use products can degrade over time, so stored product may not be effective when you next come to use it.
- Buying pre-mixed or ready-to-use products is a good option. This removes the need for mixing, preparation and the resulting clean-up.

5.6.2 Is the pesticide registered?

If you have old pesticides and herbicides that someone has given to you or that have been stored around the home for a long time, be careful. Older types of pesticides are often very toxic and may be a danger to your health and the environment. They may also be unregistered. Only purchase and use currently registered products.

It is illegal to supply an unregistered pesticide or a pesticide without an approved label (s78 and s80 of the AGVET code, see section 3.1 for further information).

It is an offence to possess or use an unregistered pesticide unless you have a permit (s6 of the AGVET Control of Use Act, see section 3.3 for further information).

What if I have an unregistered pesticide?

See section 5.9.2 for advice on the safe disposal of unregistered pesticides, other unused pesticides and pesticide wastes.

5.7 Transporting and storing home garden pesticides

Typical users of home garden pest control products do not generally transport or store large amounts of pesticides. However, transporting and storing even small amounts of pesticides can be hazardous to the pesticide user, other people and the environment.

- When buying a pesticide, either do it last in a general shopping visit or make a special trip. This reduces the risk of accidental spillage.
- When shopping do not pack pesticides into the same bags as food, animal feed or consumer goods. Also, do not transport or store pesticides together with these items.
- If possible transport pesticides in the boot of your car rather than in the cabin.
- When transporting ensure that pesticide containers are adequately sealed and secured and there are no sharp objects nearby that may puncture containers and cause leaks.
- Do not expose containers to excessive moisture or heat. Do not store in locations exposed to the weather.
- Ideally, store pesticides in a lockable, secure area that **CHILDREN CANNOT ACCESS**, and preferably in a storage shed away from the house.
- Keep pesticides in tightly closed original containers with original labels. **NEVER put pesticides in food or drink containers.**

Finally, do not store incompatible chemicals together. Many chemicals can be dangerous when they react together, leading to explosions, fire or toxic fumes. Do not store pesticides alongside pool chemicals or flammable chemicals such as petrol, oils, kerosene or other liquid hydrocarbons. Keep corrosive chemicals, such as battery acid,

away from pesticides. Keep oxidising agents, such as peroxides, away from all other materials.

5.8 Responsible use of home garden pesticides

Perhaps the greatest potential environmental risks associated with pesticide use occur when applying the product, as it is being released deliberately into the environment. There are risks of contaminating surface water and groundwaters, contaminating soils, damaging non-target organisms, and harming or causing discomfort to yourself or other people.

5.8.1 Apply pesticides only to the target area

As specified in section 4.3, to minimise the chance of harm apply pesticides only to the target area and ensure that they remain in this area. Escape from the target area through spray drift, runoff or movement through soils increases the risk of environmental harm and health risks for humans. For all use of home garden products the General Duty under the AGVET Control of Use Act must be complied with. The General Duty requires that:

When using or disposing of agricultural chemical products, all reasonable and practical measures be taken to prevent or minimise harm to humans and the environment, and off-target contamination of plants, animals or land (s5 of the AGVET Control of Use Act).

Allowing pesticides to escape from the target area also increases the risk of committing an offence under environmental legislation.

Allowing pesticides to enter waters both on or off your property is illegal under environmental legislation (Clause 9the Water Quality Policy, see section 3.2 for further information.)

You must not allow pesticides to escape from your property during or after application. This includes application of pesticides to other people's property without the owner's permission, including public land. If you wish to use herbicides to control weeds along boundary lines such as fences, gain the permission of the adjoining landholder first.

Allowing pesticides escape from your property may be a breach of your general environmental duty (s25 of the Act) and such release may also lead to the offence of environmental harm or nuisance (s79, s80 and s82 of the Act, see section 3.2 for further information.)

Missing the target area can also have impacts on your own property. Overspray of herbicides can harm non-target plants in your garden. When applying herbicides be careful to only target weeds. Some application techniques, such as painting herbicides directly onto weeds, or cutting stems and swabbing herbicide onto the cut surface, will minimise herbicide use and the risk of damaging your garden plants.

5.8.2 The importance of following label instructions

Labels provide instructions on safety and directions for use, along with a list of the product's active constituents. Before you start, read and make sure you understand the whole label, including safety directions and first aid instructions. Wear appropriate personal protective equipment as directed by the label. Always follow the label

instructions, as this will give you the most effective pest control while reducing the risks

to you, others and the environment. Under the AGVET Control of Use Act, when home garden products are used on plants or crops that are traded (sold, exchanged or bartered) mandatory label instructions must be followed.

5.8.3 Planning a pesticide application job

Careful planning will increase your chances of a successful job and reduce the chance of being left with surplus pesticide spray-mix that you have to dispose of. Applying the correct amount results in a more cost-effective pesticide use with less risk to the environment and human health.

- First, measure up the area you have to treat and work out how many square metres you have to apply pesticide to.
- Check the label instructions to see what the correct application rate is for the pesticide you are using. If your product is ready-to-use, buy only the amount you need for the job. If you are using concentrate only, prepare the volume of pesticide mix you need to treat the required area. Make sure you prepare it at the concentration specified on the label.
- Then apply the pesticide—that is, the correct amount per square metre. For example, when using a backpack or pump-up sprayer or a ready-to-use 'trigger pack', the correct application rate is approximately 50 ml per square metre of leaf/foilage area. This equates to approximately 20 square metres per litre of spray mix, or 250 ml to a cubic metre bush.
- Information on what to do for treating specific pests can be obtained from your local NRM Boards web page: www.naturalresources.sa.gov.au/home
- When applying granules and pellets, measure out the correct amount for the area of application.
- You can achieve accurate application rates with a backpack or pump-up sprayer by calibrating it. Calibration is the way of working out what volume and concentration of mix you need for the area you have to spray. You calibrate with water before you make up your spray mix. For instructions on how to calibrate a backpack or pump-up sprayer, see the EPA's guideline *Pesticide use by urban and rural lifestyle landholders*⁶ or the Mount Lofty Ranges Chemical Users Program advice sheets.

5.8.4 Mixing and preparing concentrated pesticides at home

The best way to deal with mixing and preparation is to let the manufacturer do it. If you purchase ready-mixed products, especially those already in a ready-to-use 'trigger pack', you eliminate the need to mix pesticides.

If you are applying pesticides to larger areas and using an application method such as a backpack or pump-up spray unit, you may have purchased a concentrated product. When preparing these products:

- Always read the label first to ensure you are aware of what you need to do.
- Always work in a well lit and well ventilated area.

⁶ At the time of publication this guideline is still in preparation; call the EPA for information.

- Always ensure that children and pets do not have access to the preparation area.
- Always wear the appropriate PPE (e.g. impervious rubber gloves, safety glasses, respiratory equipment) when using the concentrated product. Be aware that there are greater risks when dealing with a concentrated pesticide product.
- Try to minimise waste at each stage of pesticide use. Before you mix the pesticide determine what area you need to treat. Mix only what you need for the area you have to cover so you don't have to dispose of unused 'spray-mix' products.
- When using concentrate, measure the correct amount of pesticide into the spray container. Do not add extra as this will not give better results. Label instructions specify appropriate dilution rates to achieve effective results.
- To eliminate waste, rinse measuring and empty concentrate containers three times and add the rinse water to the tank.
- Do not combine products unless label instructions indicate it is safe to do so.
- If mixing with water make sure the quality of the water is adequate. Poor quality water, such as water that is cloudy or coloured, may reduce pesticide performance.

Do not prepare pesticide mixes in areas where an accidental spill could run into a stormwater drain or waterbody. Prepare mixes in an area with an impervious floor with bunding⁷ that will contain any spillage so it can be cleaned up. Have some absorbent material nearby to assist with spillage containment; domestic kitty litter does a good job. See section 5.9 for further information on clean-up and disposal.

5.8.5 Applying pesticides around the home

EPA experience suggests that when applying pesticides using a backpack or pump-up sprayer, home users typically apply five times too much spray mix. It is likely that people using pre-mixed products, trigger packs, aerosols, pellets and granules also over apply in the mistaken belief that more will do a better job. MORE IS NOT BETTER—always apply the pesticide at the rate specified on the label. This applies whatever application method you are using.

- Application rates are determined to give the best result. More pesticide will not work better and it will be more costly.
- Applying at higher rates may harm the plants or other organisms you are trying to protect from pests.
- Over-application onto home produce may cause contamination of crops. See section 5.2.1 for information on withholding periods for produce. A withholding period is how long you must wait after you treat crops before it is safe to pick them.
- Applying at higher rates can increase the danger to you, other people and pets. It also increases the amount of pesticides entering the environment.

Over-application presents many risks, but under-application is also unadvisable as it is false economy—it may reduce effectiveness and lead to you having to do the job twice. In summary, always apply pesticides at the rate specified on the label.

As a general rule do not apply pesticides when rain is forecast or in windy conditions. This may lead to spray drift or movement of pesticides through soils or into stormwater

⁷ Bunding - an embankment or wall of impervious material designed to contain spills of liquids.

systems or waterways. Not only does this increase the risk of illegal contamination of the environment but the effectiveness of pesticides can be drastically reduced if they are washed off the target area.

Never use pesticides near waterbodies, including streams, creeks, ponds and wetlands, unless the label explicitly states it is safe to do so. Allowing pesticides to enter waters is an offence under EPA legislation. See the EPA's guideline *Pesticide use by urban and rural lifestyle landholders*⁸ for further information on safe weed control near waters.

5.9 Cleaning equipment and disposing of unwanted pesticides

Modern home garden pesticides can cause significant harm to the environment if disposed of carelessly. Be especially careful if you have older products stored at home because these can be highly toxic and very dangerous to your health and the environment.

You can avoid clean-up and pesticide waste disposal by purchasing ready-to-use products in containers that also work as application equipment, such as trigger spray packs or aerosols. Only buy what you need—if you choose products carefully the only waste you should have to dispose of is the empty packaging.

If you buy products in concentrated form that have to be diluted or products that require special application equipment, try to eliminate waste at each stage of pesticide use. For example, mix only what you will use for each application and you will not have to dispose of unused spray mix.

If you do end up with unused pesticides or surplus pesticide spray-mix, store it safely until you can dispose of it in an appropriate way. For further advice on disposal see the EPA Information sheet *Household hazardous waste—management and disposal*.

5.9.1 Clean-up

If you use a backpack or pump-up sprayer you will probably need to clean up after pesticide application. If the label suggests wearing protective clothing during preparation and application then wear it during clean-up also.

Always clean equipment in a safe location where accidental spills can be contained and removed safely. Do not clean up in areas where an accidental spill could run into a stormwater drain or waterbody. Ideally, work in an area with an impervious floor and bunding that will contain any spillage so it can be cleaned up. Have some absorbent material nearby to assist with spillage containment; domestic kitty litter does a good job.

5.9.2 Disposal of home garden pesticide wastes

Pesticide wastes fall into three categories:

- washings and rinsate
- empty containers
- full-strength products, including unused spray mix and concentrates.

⁸ At the time of publication this guideline was still in preparation; call the EPA for information.

These are subject to different disposal requirements. Do not mix chemical wastes—it places you at risk as mixing incompatible chemicals can lead to dangerous chemical reactions and will make disposal of the chemicals more difficult.

Disposing of washings and rinsate

Clean-up may produce washings or rinsate that are contaminated with diluted pesticides. Unused full-strength pesticides, spray mix or concentrated product are not washings: see below for information on disposal of these.

There are five options when it comes to disposing of pesticide washings and rinsate.

1. Do not produce washings or rinsate—this is the ideal solution. There are many ready-to-use products that do not require dilution and are packaged in product dispensers such as trigger or hose packs.
2. Use a commercial spray contractor who deals with wastes as part of their service.
3. If you do generate washings or rinsate, reuse them to make up spray mix.
4. Dispose of washings and rinsate at an authorised waste depot or via a waste contractor.
5. Dispose of washings and rinsate in a safe way on your own property. If you have a suitable area you can spray them onto the ground. Do not spray to the point where runoff occurs and do not apply washings near sensitive areas or waters. Do not spray onto areas that pets or children have access to.

Allowing pesticide wastes to escape from your property may be a breach of your general environmental duty (s25 of the Act). Therefore, you should not apply washwater along boundary fence lines unless you have the permission of the adjoining landowner. Also, you must not apply washwater to an area where it will run off into waterways, drainage lines or stormwater systems. See section 3.2 for further information.

If you cannot avoid generating washings as part of pesticide application and you cannot find a safe and legal location to dispose of your pesticide washings, do not generate waste in the first place. Take options 1 or 2 above, or consider non-chemical options (see sections 5.4 and 5.5).

Disposing of empty containers

This section applies only to empty containers, not containers with pesticide product in them. Empty home garden pesticide containers can generally be placed in the bin for kerbside collection or disposed of at a council landfill. If the empty triple-rinsed pesticide container has the drumMUSTER logo, it can be recycled through the drumMUSTER program (contact your local council for details). However, always follow any label instructions that provide advice on disposing of empty containers. Also consider the following:

- Pressure pack aerosols—do not puncture or incinerate. Once empty, place them in the garbage for kerbside collection or recycle.
- Empty concentrate containers—when making up spray mix, triple-rinse the empty container and add the rinsate to the spray tank. Then dispose of the empty container in the garbage.

- Ready-to-use products—label instructions often suggest wrapping packaging in paper, sealing in a plastic bag and placing them in the garbage.
- Do not reuse empty pesticide containers for another purpose, dispose of them by the appropriate method listed above.

You must not incinerate or burn pesticide containers as this is a breach of your general environmental duty and may also be very dangerous (s25 of the Act, see section 3.2 for further information).

Disposing of unwanted pesticides

If you have registered pesticides that are unwanted you could consider if anyone you know may have a use for them. Family, friends, neighbours or community groups may be able to use them. It is important that you only pass on registered pesticides with intact labels so they can be used in an appropriate way.

There are two free services for householders and farmers to dispose of unwanted and/or unregistered pesticides.

The EPA's Hazardous Household Waste Depot is a service provided for householders and farmers to dispose of hazardous wastes, such as pesticides, free of charge. The depot is located at the corner of Magazine Road and Henschke Street, Dry Creek.

The depot is open on the first Tuesday of every month (excluding public holidays) between 9.00 am and midday. Special weekend openings are also arranged each year and alternative arrangements may be made for country patrons. For further information see the EPA's web site www.epa.sa.gov.au or call (08) 8204 2004 (Freecall 1800 623 445 for country callers).

Zero Waste SA also runs collections of household hazardous waste around the state in conjunction with local councils. See their web site www.zerowaste.sa.gov.au for a collection timetable or call (08) 8204 2051 for further information.

Neither service accepts wastes from government, business or commercial operations. If you have business or commercial wastes to dispose of contact an authorised hazardous waste contractor. See the 'waste reduction and disposal services' section of the Yellow Pages for contact details.

How not to dispose of pesticide wastes

Disposing of pesticides, including aerosol packs, liquids, powders and pellets, in an unsafe manner may have serious consequences for the environment and health and safety.

The EPA considers the following actions a breach of your general environmental duty (s25 of the Act), and they may also breach other provisions of environmental legislation including the Water Quality Policy (s8 and s9 of the Water Quality Policy), see section 3.2 for further information. These actions may also be very dangerous.

- *You must not dispose of waste pesticides through the kerbside collection system or into street rubbish bins. This puts garbage collectors at risk and adds contamination to landfills.*
- *You must not dump waste pesticides onto other people's property, including public land.*

- *You must not incinerate or burn pesticide wastes.*
- *You must not pour unused pesticides into drains or gutter because they will contaminate stormwaters.*

Do not pour unwanted pesticides down the sink or toilet as they can interfere with sewage treatment processes. They may also eventually be released to the environment, via both septic tanks and mains sewer systems. Do not, under any circumstances, bury unused pesticides on your own property because they can contaminate soil and leach into groundwater and stormwater.

Transporting pesticide wastes

When transporting waste pesticides consider the following:

- Don't transport your chemicals together with food, consumer goods, pets or livestock.
- Always leave original labels on containers and keep chemicals in their original containers. You may attach your own label if the original has fallen off. However, only label the container if you are sure of the name of the chemical—do not guess.
- Ensure containers are well sealed and pack them securely so they don't fall over or leak. Avoid transporting open or leaking containers—first seal them in another container such as a bucket with a lid or a plastic rubbish bin.
- Do not mix chemicals. Apart from making disposal difficult you are increasing your risk of being exposed to the chemical. In extreme cases, mixing of incompatible chemicals can lead to fire or explosion.
- Preferably transport chemicals in a trailer or utility, not in the passenger compartment of the car, where a fallen or leaking container may fill the interior with dangerous vapour. Travel with your car windows down if carrying flammable or odorous materials.

When transporting wastes you have obligations under the *Environment Protection (Waste Management) Policy 1994*.

A person who transports waste on or in a vehicle must take all reasonable and practicable steps to cover, contain or secure the waste to ensure that it remains on or in the vehicle throughout the course of transportation (s6 of the Environment Protection (Waste Management) Policy).

Disposing of swimming pool wastewater

Chlorine and other products used to disinfect swimming pools are pesticides.

You must not release swimming pool chemicals into the stormwater system or other waterbodies (clause 9 of the Water Quality Policy).

This includes both spillage from pools and occasions when your pool is being drained, as well as filtration backwash water. See the EPA Information sheet *Disposal of backwash water from swimming pools* for further information on appropriate disposal of swimming pool wastewater.

5.10 Education and training

You do not need a licence or formal training to use home garden or domestic pest control products. However, you are responsible for using them in a safe manner that does not cause harm to yourself, others or the environment.

Educated users are more likely to use pesticides in an appropriate manner. This will have a number of benefits including more effective control of the pest problem and less risk to the environment, your health and the health of others. To ensure that you use a pesticide safely you should make sure that you have informed yourself about the product and are using it in an appropriate manner.

Understanding and following the label instructions is a good start; however, you may wish to seek further information on the products you are using. Manufacturers can provide safety data sheets (SDS), which outline information on the nature of pesticide products. Retailers and manufacturers may be able to advise you on the suitability of a product for your needs. Also, see section 9 for further reading on pesticide issues.

6 AGRICULTURAL AND COMMERCIAL PESTICIDES

6.1 Effective management of pest problems

Careful planning and management will often reduce pest problems in the first instance. For primary producers this should result in reduced pesticide use, better quality produce, lower costs and higher profits. If you are managing pests that cause environmental, amenity or public health problems, including around recreational facilities such as parks, gardens and golf courses, planning should achieve more effective results at a lower cost.

For all pesticide users careful management should lower the risks of:

- harm to the environment
- harm to human health and wellbeing
- off-target crop or property damage.

Sound planning should also reduce the chances of pests developing resistance to pesticides.

If possible, use preventive strategies that reduce the chance of pest problems in the first place. Effective early prevention may reduce the frequency and intensity of pest problems and reduce pesticide use. Consider strategies such as termite-resistant building materials or pest-resistant crop varieties. If pest control is required, consider non-chemical or mixed control methods.

According to *Crop spraying techniques and equipment* (Alcorn 1993), there are five steps to effective pest control. Apply this approach to pests in both agricultural and non-agricultural situations.

1. Identify the pest type and its life cycle. Determine if a single pest or a combination causes the problem.
2. Examine what control options are available. Pesticides may be the best solution, either alone or in conjunction with non-chemical methods. If you decide to use

pesticides, whenever possible incorporate them in an integrated pest management (IPM) system. (see section 8.1.3).

3. Identify exactly where and at what stage in the pest's development the pesticide application should be applied.
4. Decide the best method of delivering the pesticide to the target.
5. Check the environmental conditions and proceed with application only if they are suitable for your combination of pesticide, application method and pest.

6.1.1 The economics of pest control

Primary producers and other users of agricultural and commercial pesticides face significant costs when purchasing and applying pesticides themselves, or when using a commercial pest controller. The presence of a pest may not always be enough to justify chemical control, especially if the cost of control is greater than the benefit. Before applying a pesticide try to estimate both the costs and economic benefit of control. If

the economic benefit is less than the cost of control, you should consider whether control is really viable.

6.1.2 Knowing your pest

Good management of pest problems is best achieved through an understanding of your pest. Time taken to gain a better understanding of the pest you are trying to manage can save significant amounts of time and money in the longer term. Information sheets on pests and diseases are available from state and federal government agriculture departments including:

- fact sheets from PIRSA and SARDI at www.pir.sa.gov.au/factsheets
- pest note sheets from the Victorian Department of Primary Industries web site www.dpi.vic.gov.au
- pest notes from the federal Department of Agriculture, Fisheries and Forestry web site www.affa.gov.au.

The PIRSA Roseworthy Information Centre has a range of publications on pests and details are in their annual catalogue. Contact them on 1800 356 446 or see their web site www.ruralsolutions.sa.gov.au/bookshop. They also distribute PrimeNotes⁹, an extensive CD-R collation of over 5000 notes and fact sheets on primary industry and natural resource management issues.

There is a wealth of information available from other credible Internet sources, both electronic material you can often download at no cost, along with publications such as pest guides which you can purchase. Use Australian web sites and preferably government agency sites to ensure the quality and relevance of information provided. Some web sites such as OzRural www.ozrural.com/agmedia.htm and the Rural Store www.theruralstore.com.au give users access to a wide range of rural and reference titles available for purchase on pests and pest management. In addition, your industry association may be able to provide information on effective management of different pests and diseases.

6.1.3 Consider an integrated approach

The concept of integrated pest management (IPM) was developed in the 1970s, and today IPM is widely and successfully used in agricultural production. Historically, pesticides were often used as a quick fix when pest problems arose, or routinely applied on a calendar basis as a precaution. In contrast, IPM involves using preventive methods combined with targeted pesticide application when there is a real need. IPM principles can also be applied to non-agricultural pest management.

IPM methods are more environmentally and economically sustainable, as well as more permanent and cost-effective in the long term, not just the short term. IPM programs involve an understanding of the impact of pesticides and other control measures on both pests and other organisms. Employing a range of control methods minimises the chance of pests becoming a problem. In addition to pesticides, IPM strategies include:

⁹ Published by the Queensland Department of Primary Industries and Fisheries

- cultural methods such as crop rotation, which breaks the pests' habitat; and nutrition availability along with good crop and site hygiene, which reduce the risk of pest infestation
- biological control including promotion of natural, or introduction of supplementary, control organisms such as predators, parasites and pathogens
- appropriate crop choice and varietal selection including the use of pest-resistant plant varieties or, in the case of termites, pest-resistant construction materials
- physical methods such as pest barriers or light traps.

These methods are combined with monitoring to determine when pests are at a level where they are likely to cause problems. This allows control methods to be effectively targeted and triggers pesticide use only when needed, reducing chemical costs.

Pesticide choice is important. If possible use pesticides that are selective for your pest, of lower toxicity and low residual action, rather than broad-spectrum pesticides. This helps maintain beneficial organisms such as predators, and reduces the chances of resistance and secondary pests.

Effective use of IPM will provide a sustainable and effective long-term solution to pest problems. It can also have significant financial benefits. In a recent case study, a potato grower saved \$55,000 on chemicals alone in the first five years that he used IPM, without any compromise on yield or quality. See the horticulture section of the South Australian Research and Development Institute (SARDI) web site for the case study *Using integrated pest management (IPM) on farm—*

www.sardi.sa.gov.au/pages/horticulture/pathology/hort_pn_usingipm.htm.

For further information on IPM see the following resources:

- the PIRSA fact sheet *Integrated pest management—what does it really mean?* (available from PIRSA's web site www.pir.sa.gov.au/factsheets)
- CSIRO's *IPM Australia* web site www.ento.csiro.au/ipm
- CSIRO's *IPM Modelling Network* web page www.ento.csiro.au/IPModellingNetwork
- the Australian Biological Control web site www.goodbugs.org.au for information on IPM, biological control agents and availability of *The good bug book*, a guide to commercially available biological control agents
- a viticulture-specific CD titled *Spray Smart*, produced by the CRC for Viticulture, which includes extensive spraying and IPM information (contact info@winetac.com.au for more details)
- your industry association, which may be able to provide specific advice on IPM for the crops you are growing.

Consultants can be helpful in developing and maintaining an IPM program. PIRSA's Rural Solutions (see [section 10](#) for contact details) provides services in this area, and other agricultural consultants can be found in the 'Farm and agricultural advisory services' listing in the Yellow Pages.

6.1.4 Managing resistance

Note that within any pesticide program, including an IPM program, you may sometimes have to use products from different pesticide resistance management groups to prevent

the development of resistance. You should always follow appropriate resistance management principles. Information on resistance management is available from the Avcare web site www.avcare.org.au, the Grain Research and Development Corporation web site www.grdc.com.au or the Australian Wine Research Institute web site www.awri.com.au/infoservice/publications/Publication%20PDFs/booklet.pdf.

6.1.5 Environmental management systems

It may be beneficial to structure your pest management program within an environmental management system (EMS). Within an EMS you can identify, manage and reduce your impact on the environment by establishing, documenting and implementing procedures designed to meet environmental performance requirements relevant to your activities. Periodically you then monitor, review and report on your system, and make changes if required.

When an organisation uses an EMS it ensures that environmental management is incorporated into, and becomes an everyday part of, normal business operations. Within an EMS system you identify relevant legislative and regulatory requirements, reducing the risk of breaching environmental law and causing environmental harm. This will also reduce business risks and may bring other advantages. For example, sound environmental management may also be an effective marketing tool. In fact, for access to some markets an appropriate EMS is essential, and this trend appears to be increasing.

The PIRSA web site www.pir.sa.gov.au has information on EMS, and your industry association may also be able to provide advice. The Rural Industries Research and Development Corporation (RIRDC) also has a webpage www.rirdc.gov.au/ems on EMS in agriculture. The CRC for Viticulture web site www.crcv.com.au/education/rtp has information on courses to get started with an EMS in viticulture.

6.2 Choosing and purchasing agricultural and commercial pesticides

Ensure you buy a pesticide that is suited to your pest, crop or situation, application method and application environment. If possible choose a low toxicity product that has a low residual effect and is selective for your pest.

Some products are more likely to drift or be transported in water or through soils. Avoid these products as they will move off-target more readily and may present a greater risk to the environment, increasing the chance of chemical trespass. See the EPA *Commercial Spray Operator Guideline*¹⁰ for further information.

You should not buy more than you need for the foreseeable future. While there are advantages in bulk purchases, such as cheaper prices and ready access to pesticides as you need them, this should be balanced against the problems of safe storage. Consider buying what you need for the coming season or year, but you should not stockpile excessive amounts of pesticides. Not only will this present issues with storage but the effectiveness of stored pesticides may be reduced over time, especially if they are

¹⁰ At the time of publication this guideline was still in preparation; call the EPA for information.

exposed to extremes in temperature. Furthermore, products can be deregistered, your needs may change and better products may become available.

- Only buy pesticides from appropriate outlets. Consider those that hold AGSAFE accreditation.
- Ideally, to minimise waste, buy chemicals in refillable containers and return them to the retailer when you have emptied them.
- Only buy a pesticide with an intact label in a properly sealed and undamaged container.
- When you buy the pesticide, obtain an SDS from the supplier, importer or manufacturer. Make sure you read and understand the safety and health information on both the label and the SDS.

6.2.1 Is the pesticide registered?

If you have old pesticides and herbicides that someone has given to you, or which have been stored for a long time, be careful. Older types of pesticides are often very toxic and may be a danger to your health and the environment. In most cases they will not have the same effectiveness as outlined on the label, or they could reformulate and be more toxic than the original product. They may also be unregistered. Only buy and use currently registered products.

It is illegal to supply an unregistered pesticide or a pesticide without an approved label (s80 of the AGVET code, see section 3.1 for further information).

It is an offence to possess or use an unregistered pesticide unless you have a permit (s6 of the AGVET Control of Use Act, see section 3.3 for further information).

See section 6.4.7 for further information on permits. If a product in your possession is deregistered you may have a grace period of up to four years to use remaining stocks, but under some circumstances this period may be reduced (see section 3.3 for details).

6.3 Health and safety with commercial and agricultural pesticides

Many pesticides are hazardous chemicals. Exposure can cause reactions in humans ranging from irritation to severe illness or death. Exposure to some pesticides may also cause chronic problems that do not become apparent until some time after exposure. Therefore, the safest approach is to minimise your exposure to pesticides. The poison schedule of a pesticide and its SDS can be used as a guide to the potential health risk it poses (see section 3.8 for details).

6.3.1 Safety tips when dealing with pesticides

- Always obtain and read the product label, SDS and appropriate workplace safe operating procedures (SOP) before using a pesticide. Only use the pesticide in accordance with the instructions on the label.
- Check that all the workplace safety equipment is available (outlined in the WHS codes and Regulations)—for example, safety showers and eye baths.
- Do not work alone when you are using highly toxic pesticides, such as Schedule 7 poisons.

- Always wear personal protective equipment (PPE) if specified by the pesticide label or your workplace SOP. Make sure it is appropriate for the pesticide you are about to use, fits properly, is clean and is undamaged before each use.
- Some pesticide application equipment can be very loud and may harm your hearing. Make sure you wear ear protection if required.
- Respirators will not work unless they fit properly and are maintained correctly. If you use a respirator make sure you are properly trained in how to fit it. Do not use odour to indicate when you should change the cartridge or filters because once you can smell the chemical it may already be doing you harm. Change the cartridge or filter at regular intervals before it fails.
- Remove your PPE and then wash your hands with soap before eating, drinking, smoking or going to the toilet. Also do this at the end of the job.
- Thoroughly wash your PPE after each job and store it appropriately. Make sure you have appropriate training in the use and care of your safety equipment.
- Immediately report any illness or discomfort that occurs during or soon after handling a pesticide, preferably to your supervisor or employer. If you are self-employed or your supervisor or employer is not nearby, report it to a workmate or the closest reliable person in case your condition deteriorates.
- If you have been exposed to a toxic pesticide, including by inhalation, skin contact or ingestion, seek medical attention or call the Poisons Information Centre on 13 11 26 as soon as possible.

6.3.2 Pesticides in the workplace

Once you purchase a pesticide for work purposes, or enter a workplace where they are used, you are required to consider health and safety issues. This includes issues related to the transport, storage, preparation, application, clean-up and disposal of pesticide products.

A workplace is any place (including any aircraft, ship or vehicle) where an employee or self-employed person works, and includes any place where such a person goes while at work (the WHS Act).

The general obligations of employers, employees and the self-employed under the WHS Act 2012 are detailed in section 3.6. This legislation, along with that dealing with hazardous substances, is administered by SafeWork SA.

6.3.3 Responsibilities of employers and the self-employed when dealing with prescribed hazardous substances

In addition to the general WHS responsibilities detailed in section 3.6, there are requirements regarding the use of prescribed hazardous substances in a workplace. The product SDS will state if the pesticide you are using is a hazardous substance. You can obtain a product SDS from the supplier, importer or manufacturer.

If you are an employer or self-employed person you also have a number of mandatory obligations under Division 3 of the WHS Act and Chapter 7 of the WHS Regulations, administered by SafeWork SA. These cover the storage, transport, use and disposal of hazardous substances and include:

- *Keep a register of all hazardous chemicals in the workplace, including a SDS for each substance, and make this available to employees.*
- *All prescribed hazardous chemicals must be labelled appropriately (see the Approved code of practice for the control of workplace hazardous substances 1995 for further information). Do not decant pesticides into unlabelled containers unless it is for immediate use. If a hazardous substance is decanted and not fully used immediately, the employer must ensure that the container into which the substance has been decanted is labelled with the product name and the relevant risk and safety phrases.*
- *Carry out a written risk assessment of circumstances or tasks in the workplace where your employees are potentially exposed to a hazardous chemical. Refer to pesticide SDSs and product labels when conducting your risk assessments.*
- *You are required to keep records of the risk assessment. Provision for health surveillance may also apply if exposure to a hazardous substance may lead to a disease or ill health and if there is a means of measuring the effect (refer to WHS Regulations for further information).*
- *If a hazardous substance poses a risk to employees' health or safety, you are required to develop and implement appropriate safe operating procedures (SOPs) and control methods to minimise risk of harm to your employees. This applies to any activity, such as, transporting, storing, mixing, preparing, applying, cleaning up and disposing of the hazardous pesticides. You are required to train your employees so they can properly use and maintain any equipment required as part of your operations.*
- *You are required to supply appropriate safety and first aid equipment as determined by your risk assessment. This includes whatever protective clothing, respirators, clean-up and washing facilities, first aid kits, eye wash facilities, safety showers and spill kits. Appropriate equipment is required in buildings and for vehicle based operations.*
- *You are required to induct and adequately train yourself and all staff who may potentially be exposed to prescribed hazardous chemicals. This includes training on SOPs and use of safety equipment. You are also required to keep records of this training.*

Appropriate pesticide control methods may include measures such as closed-system transfer for mixing of pesticides, closed vehicle cabs with filtering systems, and appropriate personal protective equipment. It may also include monitoring, such as baseline blood tests, for employees who are handling organophosphates or other pesticides that require health surveillance.

For guidance on how to achieve the minimum standards of health and safety required, see the *Approved code of practice for the control of workplace hazardous substances 1995*, available from the SafeWork SA web site www.safework.sa.gov.au.

You are required to implement the minimum requirements of the Approved code of practice for the control of workplace hazardous substances (the WHS Act).

Further information on safety, risk assessment and safe operating procedures is available from SafeWork SA, and the National Occupational Health and Safety Commission (NOHSC)¹¹.

There are also many resources on the SafeWork SA web site www.safework.sa.gov.au including:

- *Major workplace hazards: Responsible use of chemicals*
- *Major workplace hazards: Chemical use*
- *Major workplace hazards: Pesticides.*

NOHSC web site www.nohsc.gov.au resources include:

- *Guidance note for the assessment of health risks arising from the use of hazardous substances in the workplace*
- the Hazardous Substances Information System database (www.nohsc.gov.au/applications/hsis/), which includes:
 - exposure standards for atmospheric contaminants in the occupational environment
 - a list of designated hazardous substances.

6.3.4 Responsibilities of employees when dealing with hazardous substances

In addition to the general WHS provisions outlined in section 3.6.1, employees must also take certain measures when dealing with hazardous substances, as outlined in the WHS Act. These include:

- *An employee must take reasonable care to protect the employee's own health and safety at work.*
- *An employee must take reasonable care to avoid adversely affecting the health or safety of any other person through an act or omission at work.*
- *An employee must so far as is reasonable:*
 - (a) *use equipment provided by their employer for health or safety purposes*
 - (b) *obey reasonable instruction that the employer may give in relation to health or safety at work*
 - (c) *comply with any policy that applies at the workplace*
 - (d) *ensure that the employee is not, by the consumption of alcohol or a drug, in such a state as to endanger the employee's own safety at work or the safety of any other person at work.*

Employees also have to tell their employers about anything that is likely to affect their own health and safety or that of others. This might include the immediate reporting of missing labels, leaking containers or equipment in need of maintenance or repair.

¹⁰ The Australian Safety and Compensation Council (ASCC), a new advisory body in the Department of Employment and Workplace Relations (DEWR), has taken over the role of NOHSC; however, their publications will still be referenced as NOHSC publications.

6.3.5 Using pesticides where there is a risk to people or other non-target organisms

Inappropriate pesticide application in some areas, such as schools, may have dire consequences. Baits to control snails or rodents may be ingested by children, pets or domestic animals. Baiting programs to control feral animals such as foxes need to be conducted carefully to avoid the poisoning of non-target native species. In recreational and sporting areas such as golf courses, adults also run the risk of coming into contact with pesticide residues. Skin contact or hand-to-mouth transfer of pesticides may occur at sporting facilities where pesticides are used.

- Avoid spreading around granules or pellets if there is a risk of accidental swallowing.
- Do not use products labelled 'DANGEROUS POISON' or 'POISON' in areas where there is a risk of poisoning non-targeted species unless you can restrict access. Spray residue can be ingested or absorbed through the skin. As a minimum you should erect warning signs if using toxic products.
- Try to use products of a lower toxicity and avoid products with a long residual action.

The National Environmental Health Forum's *Pesticide use in schools and school grounds* (Buckett and Di Marco, 1997) gives further advice on pesticide safety in schools. It is available on line at the publications section of the Department of Health's web site www.health.sa.gov.au.

Application of pesticides may affect many non-target species; this is particularly important where threatened species may be affected. This may include poisoning of threatened insects such as some butterfly species, or useful predators such as the praying mantids. Pesticides can also have a secondary effect on other species that rely on the targeted pest as a food source. An appropriate spraying technique should be used for each situation, using combinations of aerial, boom and backpack spraying. Contact the Department of Environment, Water and Natural Resources (DEWNR) information helpline on (08) 8204 1910 or by e-mail www.environment.sa.gov.au/Home for the current recommendations on aerial, boom and backpack spraying near threatened species.

6.4 Transport and storage of pesticides

When storing and transporting pesticides you are often dealing with large quantities of concentrated product. This can be hazardous to you, the environment and others.

Always check the pesticide label and SDS before transporting or storing a pesticide so you can determine its toxicity and whether it is a hazardous or dangerous substance. If it is a hazardous or dangerous substance make sure you comply with your obligations under relevant dangerous substances and WHS legislation. If you are a pest controller or pest technician you must also comply with requirements under the Controlled Substances Pesticide Regulations.

6.4.1 Transport of pesticides

If the pesticide you are carrying is toxic, such as an S5, S6 or S7 poison, or is flammable or corrosive:

- You should only transport it in a utility or trailer and never in the cabin of a vehicle.

Avoid using the vehicle boot, as boots are connected to the cabin.

- If you have to transport it in the cabin or boot of a vehicle, consider placing the packaged pesticide into a spill proof container with a close-fitting lid.
- For commercial operators (pest control technicians and licensed spray contractors) transportation of pesticides must comply with the controlled substances legislation.
- Make sure pesticides are safely secured on the vehicle and transported in a sealed and undamaged container—ideally, the original container.
- Do not transport pesticides with incompatible chemicals, flammable materials, oxidising agents, food, animal feed, sharp implements or medical supplies.
- Carry and make sure you are trained in the use of the appropriate PPE and clean-up equipment.

If you are transporting spray mix between a preparation area and a job you are still required to meet your legislative obligations. If required you must comply with dangerous substances legislation by developing and implementing SOPs for prescribed hazardous substances (see section 6.3.3). Furthermore, licensed pest controllers must comply with requirements under the Controlled Substances Pesticide Regulations (see section 6.4.5).

6.4.2 Storage of pesticides

To avoid having to store excessive amounts of pesticides, buy only what you need for the foreseeable future. As noted in section 6.2, while there are advantages in bulk purchases such as cheaper prices and ready access to pesticides as you need them, this should be balanced against the problems of safe storage and the possibility of changing circumstances leaving you with unwanted pesticides. Disposal of unwanted pesticides can be difficult and costly.

Follow the storage instructions on the pesticide label. You must follow the mandatory instructions and you should follow all other instructions unless you have good reason not to (see section 6.4.6 for further information on label instructions). You should also keep a list of, and an SDS for, each of the pesticides you have in storage (referred to as a Hazardous Substances Manifest). Store pesticides in suitable containers only, preferably the original containers with the labels intact.

Agricultural and commercial pesticides must be kept in a suitable container clearly marked or labelled with the name of the product, and the name and concentration of each of the active constituents of the product, as indicated on the approved label or permit. A bottle or container that has been used for, or is designed for use of, drink or food is not a suitable container (s8 of the AGVET Control of Use Act).

Pesticides should always be stored in accordance with the Australian Standard AS 2507-1998 *The storage and handling of agricultural and veterinary chemicals*, which is available for purchase online at www.standards.com.au. If you only store a small quantity of chemicals you should follow the minor storage conditions of this standard. Ideally, your storage area will:

- have appropriate PPE, first aid equipment and a spill clean-up kit
- have convenient access to running water
- have an impervious floor and good ventilation
- be appropriately bunded. Tank storage bunding should be able to contain a spill of 120% of the capacity of the largest tank, and 133% if the stored liquids are flammable. Bunding for packaged products should be able to retain 25% of the total volume of the stored products. See the EPA guideline *Bunding and spill management* for further information on bunding.

- be a safe distance from other buildings, your property boundary, watercourses and drains
- have appropriate signage, i.e. 'Hazchem', on the front wall.

6.4.3 Transport and storage of hazardous substances

If the pesticide you are transporting or storing is a hazardous substance you are required to comply with your obligations under the WHS legislation, such as following your SOP. Your SOP should include regular checks of stored pesticides for leaks, spills or packaging damage, along with provision of and training in the use of suitable spill clean-up and containment equipment. See section 6.3.3 for further information.

6.4.4 Transport and storage of dangerous goods

If you store pesticides that are Class 6 (toxic) or Class 3 (flammable) dangerous goods, you must comply with the relevant requirements of the dangerous substances legislation. The hazard posed by dangerous goods and substances is indicated by their packing group (PG). The rating of Class 6 goods is based on toxicity and of Class 3 goods on flammability.

- PGI are goods of great danger
- PGII are goods of medium danger
- PGIII are goods of minor danger.

The requirements under this legislation are extensive; if in doubt check the regulations or contact SafeWork SA at www.safework.sa.gov.au.

Transport of dangerous goods

Under most circumstances, if you are transporting pesticides that are dangerous goods by road you are required to carry an inventory of the quantities and types of pesticide being transported. You should also carry an SDS for each pesticide.

If you transport more than 250 kilograms or 250 litres of packaged or bulk dangerous goods, you may have to display hazard placards and meet other requirements including emergency procedure guides, protective clothing and driver training.

For further information on the above and to determine if your load triggers the requirement for placards see brochure *Safeguards DS 7 Transporting dangerous goods by road*, available on the SafeWork SA web site www.safework.sa.gov.au.

Storage of Class 6 (toxic substances)

Mandatory conditions for storage of Class 6 substances under s61 of the Dangerous Substances Regulations (SafeWork SA) include:

- *The store must fully protect the class 6 substances from the weather and must be reasonably secure from access by unauthorised persons and securely locked when unattended.*
- *If you store more than 50 litres or 50 kilograms of Class 6 PGI goods you must have class labels at each entrance to the store and at the entrance of the building that*

contains the store.

- *You must make sure different substances in the store cannot react with each other, and keep pesticides away from foodstuffs, foodstuff packaging and medical goods.*
- *The premises must be designed and constructed (by draining, grading, bunding or otherwise) to ensure that a spillage or leak would be wholly contained within the premises.*

In addition to the above, if you store enough Class 6 substances to require a licence there are further conditions outlined in s60 of the Dangerous Substances Regulations. These include requirements for signage, bunding, spill clean-up equipment and protective equipment.

You will require a licence if you store more than any of the following:

- 250 kg or 250 L of PGI Class 6 dangerous goods
- 2000 kg or 2000 L of PGII Class 6 dangerous goods
- 5000 kg or 5000 L of PGIII Class 6 dangerous goods

or if you exceed a combined total of two or more of the above as determined by the relevant formula in s58 of the Dangerous Substances Regulations.

For further details on licences and storage conditions see the SafeWork SA brochure *Safeguards DS 5 Class 6 & 8 dangerous substances*, available from their web site www.safework.sa.gov.au.

Storage of Class 3 (flammable substances)

Under s41 of the Dangerous Substances Regulations you may require a licence if you store more than 120 litres of Class 3 PGI or PGII, or 1200 litres of Class 3 PGIII, dangerous goods. However, special provisions are made for properties of at least two hectares used for 'rural industry'. In these cases up to 500 litres of Class 3 PGI or PGII and up to 5000 litres of Class 3 PGIII, may be stored without a licence. Special provisions are also made for the storage of some packaged goods. Safety rules still apply for unlicensed storage. For further information see the SafeWork SA brochure *Safeguards DS4 Class 3 dangerous substances* or s41 and s42 the Dangerous Substances Regulations.

6.4.5 Licensed pest controllers: transport and storage of pesticides

In addition to the above requirements for transport and storage, if you are a licensed pest controller you are required to comply with the following in the course of your business according to s16 and s17 of the Controlled Substances Pesticide Regulations (DH Environmental Health Service).

- *Pesticides must be transported in a securely closed container that bears the approved label for that pesticide, or if the pesticide's use is regulated by an APVMA permit then details from the permit.*
- *When a pesticide is being transported in a spray tank it must be labelled with the word 'CAUTION' or 'POISON' or other approved warning along with the name of the pesticide.*
- *Pesticides must not be left in an unattended vehicle unless the pesticide is securely locked within that vehicle or within an enclosed storage facility, including a spray tank that is securely attached to the vehicle.*

- *The driving compartment of the vehicle used to transport the pesticide must be separated from the pesticide storage area by a gas-tight barrier.*
- *All pesticides must be kept in containers that bear an approved label and kept securely closed.*
- *All pesticides must be housed in a structure that has a roof and a floor that is impervious to water, is adequately ventilated and is locked when unattended.*
- *The storage area must have an adequate supply of water available.*
- *The storage area must be constructed in a way that that a spillage of pesticide cannot drain into a water supply or watercourse or soak into the soil.*

6.4.6 The importance of labels and following label instructions

The safety and effectiveness of pesticide application depends on appropriate use. Labels provide instructions on the safety, use and disposal of pesticides, and lists of active constituents and other ingredients. Labels also explain the pests, crops and situations where the pesticide may be applied, and set out allowable application rates and frequencies.

A person must not use or dispose of a pesticide in contravention of a mandatory label instruction unless authorised by a permit (s7 of the AGVET Control of Use Act).

You must follow mandatory label instructions and you should follow all other instructions on a label unless you have good reason not to. According to s4 of the AGVET Control of Use Regulations (PIRSA Rural Chemicals Program), label instructions are mandatory if they:

- *use the words 'must', 'must not', 'may not', 'do not', 'not to be used', 'not for use' or 'use only'*
- *state that the product can only be used by a person with specific qualifications.*

According to s6 of the AGVET Control of Use Regulations (PIRSA Rural Chemicals Program), if the label includes instructions for use on specified crops, the product:

- *must not be used on any other crop*
- *must not be used at a higher rate/frequency than that listed for South Australia*
- *must not be used at a higher rate/frequency than that listed for another state if South Australia is not listed.*

Use of a pesticide in a manner that varies from the label instructions is called 'off-label use'. In South Australia limited off-label use is allowed for activities deemed as low risk.

- You may use a pesticide at less than the label rate of application.
- You may use a pesticide less frequently than advised on the label.
- You may use a pesticide to treat a pest not mentioned on the label as long as the crop is specified and you follow all other label conditions.
- If there are no instructions for the use of the product on a crop in South Australia, then the product may be used on that crop if it is listed for another state. The product must not be used at a higher rate or frequency than listed for the crop in the other state, and must not be used if the label specifies that it is not for use in South Australia.
- You may apply to PIRSA for an exemption to enable the off-label use of pesticides on a listed minor crop if you participate in an audited Quality Assurance Scheme.

Contact PIRSA on (08) 8226 0549 for further information. The exemption is for up to three years, after which a permit will be required to continue off-label use.

It is important to note that label directions are not detailed enough to cover every combination of circumstances that may arise during pesticide use. Following the instructions will tend to reduce the risks but will not always prevent, and is not necessarily a defence against, breaches of legislation. You should always consider the circumstances when using pesticides.

6.4.7 Permits

You can also apply to the APVMA for a permit to use a pesticide in a manner contrary to the label instructions or to use an unregistered pesticide. Once the permit has been approved it has the same status as a label, and failing to follow permit instructions can be an offence. The APVMA can only issue permits under certain circumstances, for example:

- a minor use (e.g. for an uncommon pest or on a minor crop)
- an emergency use
- research purposes.

Permits are not a way around the normal process of registering products. Therefore, the APVMA will not grant a permit for off-label use if there is a registered product currently available for that purpose. Contact the APVMA or visit their web site www.apvma.gov.au for further information on permits for off-label use.

6.4.8 Responsibilities of pest control operators and pest management technicians

In addition to the preceding requirements for usage, if you are a licensed pest controller you are required to ensure the following in the course of your business.

The handling and use of the pesticide must comply with the label instructions. The pesticide must only be used for a purpose stated on the approved label unless an alternative purpose is allowed by an APVMA permit. Pest management technicians are also required to comply with these requirements (s19 of the Controlled Substance Pesticide Regulations).

Pest controllers must also ensure that pest control work carried out in the course of their business complies with the following standards and codes. Pest management technicians are also required to comply with these (s18 of the Controlled Substance Pesticide Regulations).

Australian Standards can be purchased online at www.standards.com.au or see [section 10](#) for contact details. Contact the DH Environmental Health Service for South Australian Health Commission codes of practice (see [section 10](#) for contact details).

- AS 3660.1–2000 *Termite management – New building work*
- AS 3660.2–2000 *Termite management – In and around existing buildings and structures*
- South Australian Health Commission *Code of Practice for Diluting Pesticides from a Water Supply*
- South Australian Health Commission *Termiticides (Safe Use) Code of Practice*

6.5 Planning a pesticide application job

When planning a spray job calculate the size of the application area and check the label to determine the correct rate of application for your pest, crop or situation. Then use this information to determine the amount of spray mix you need. Mixing and applying the correct amount of pesticide results in more cost-effective pesticide use with less risk to the environment and human health.

Applying pesticides at a higher rate than specified on the label is illegal unless you have an APVMA permit (s6 to s8 of the AGVET Control of Use Act, see section 6.4.6 for more details).

Careless preparation can also result in excess spray mix that can be difficult and potentially costly to dispose of. Making up excess mix and applying pesticides at higher than allowed rates will lead to you paying for more product than you need.

6.5.1 Employing a spray contractor

If you employ a spray contractor ask them if they are licensed under the Controlled Substances Pesticide Regulations. Discuss and plan the job thoroughly with them and make sure they are aware of sensitive areas in the vicinity of the target zone. It is a good idea to also provide a map of the water course(s) on your property. Satisfy yourself that they are capable of carrying out the job in a competent and safe manner. Good communication will lead to a better result with less chance of environmental or safety problems.

6.5.2 Equipment calibration and maintenance

Properly calibrated and maintained equipment is essential to achieve effective, cost-efficient and environmentally sustainable pesticide application. Queensland research on boom sprays in the 1980s found that less than 50% of the nozzles surveyed were within 10% of the manufacturer's specifications. This indicates that replacement of faulty nozzles, and correct maintenance and calibration of equipment, is essential. *Crop spraying techniques and equipment* (Alcorn 1993) suggests that calibration of equipment at least once each spraying day would lead to 'a better spraying job and slash chemical costs'. It would also lower the potential for harmful environmental consequences.

Details on the calibration of equipment is beyond the scope of this guideline. Further information is available from PIRSA's web site www.pir.sa.gov.au/factsheets. See the fact sheets:

- *Setting up a boom spray*
- *Boom spray cleaning, maintenance and calibration*
- *Calibration of airblast sprayers.*

The fact sheets from the Mount Lofty Ranges Chemical Users Program contain details on the calibration of backpack and pump-up sprayers. These fact sheets can be obtained from the EPA (see [section 10](#) for contact details). Section 3 of *Crop spraying techniques and equipment* (Alcorn 1993) also provides advice on calibrating and maintaining a range of spray equipment.

6.5.3 Mixing and preparing agricultural and commercial pesticides

When preparing pesticides for use you are often dealing with concentrated substances that may be hazardous to your health and the environment. Escape of spilled concentrates can contaminate soils, make waters unsuitable for drinking and be catastrophic for aquatic ecosystems. Spilled product is wasted time and money and there is clean-up and disposal to consider as well. Ideally, minimise the risk of a spill and reduce or eliminate your contact with pesticides by using closed loading systems, auto fillers or wettable powder mixers. When mixing pesticides:

If you are dealing with a pesticide that is a prescribed hazardous substance you must follow the requirements of your SOP (chapter 4 of the WHS Regulations, see section 6.3.3).

- Make sure you wear appropriate safety equipment and have suitable clean-up equipment in case of a spill.
- You should take only what you need from your store to the application site and never leave pesticides unattended or unsecured. Return all unused pesticides to your store at the end of the day.

If you are a licensed pest controller you must not leave pesticides unsecured (s16 of the Controlled Substances Pesticide Regulations, see section 6.4.5 for more details).

- Make sure your equipment complies with Australian Standard AS/NZS 3500.1.2-1998 *National plumbing and drainage: Water supply—Acceptable solutions*. You should have a minimum air gap of 50 mm between your filling hose and the top of the tank. This will prevent pesticides from being drawn back from the tank into the water supply.

If you are a licensed pest controller you must comply with the South Australian Health Commission Code of Practice for Diluting Pesticides from a Water Supply (s18 of the Controlled Substances Pesticide Regulations, see section 6.4.8).

- Open bags carefully by cutting rather than tearing, and do not pour concentrates from one container to another above shoulder height. This will help to eliminate spillage.
- To ensure that you apply the pesticide at the correct rate, accurately measure out the amount of concentrated product you need.
- To eliminate waste, rinse measuring containers three times and add the rinse water to the tank. Do the same with empty product drums.
- Never siphon pesticides and do not stir pesticides with your hands.
- Mix pesticides outdoors or in a well-ventilated area.
- If possible, mix pesticides on an impervious surface in a location where spills can be contained, cleaned up and disposed of appropriately. Ideally, set up a bunded area with a sump that can be used for pesticide preparation and clean-up.
- Do not mix pesticides in an area where spills might drain into a waterbody or stormwater system.

6.6 Application of agricultural and commercial pesticides

There are significant environmental risks associated with pesticide application because pesticides are being released into the environment. There is the potential for contamination of surface water and groundwaters, contamination of soils, damage to

non-target organisms, and harm or discomfort to yourself or other people. Once the decision is taken to use pesticides, *Crop spraying techniques and equipment* (Alcorn 1993) suggests the following approach:

‘deliver the most suitable chemical at the appropriate time in the correct dosage to the right target and nowhere else’.

This approach will lead to the most effective pest control while reducing the risk of off-target impacts. It is of value not only to field crops but in all situations where pesticides are used.

6.6.1 Safety

Make sure you are familiar with the safety information on the pesticide label and the SDS before applying a pesticide. Wear appropriate safety equipment for the job.

If you are dealing with a pesticide that is a prescribed hazardous substance you must follow the requirements of your SOP (chapter 4 of the WHS Regulations, see section 6.3.3 for details).

Always follow label instructions about re-entry to a sprayed area. Advise staff and visitors of the presence of recently sprayed areas and use warning signs if required. If there is no re-entry period stated on the label, stay out of the treated area until the spray deposit has dried and the air is clear of vapours.

6.6.2 Environmental risks of pesticide application and your legal responsibilities

An important aspect of best practice in pesticide application is to minimise the chance of contaminating off-target areas, even within your own property. Pesticide escaping from the target area through spray drift, runoff or movement through soils elevates the risk of environmental harm and health risks for humans. Off-target movement of pesticides by these avenues or any other manner may also breach various legal requirements.

Contaminating land outside your property, including public land, may breach your general environmental duty under s25 of the Act (see section 3.2.1).

Contamination of waters with pesticides, even waters on your own land, may be an offence under the Water Quality Policy (see section 3.2.4).

Escape or release of pesticides from your property or into waters may also lead to an offence of environmental harm or nuisance under s79, s80 and s82 the Act (see section 3.2.2).

Furthermore, if your actions lead to the escape or release of pesticides that damage other people's property they may take civil action against you. You could be liable to pay damages however if you have used the chemical according to the label then the following applies:

Division 2—Offences

- a) the lawful use of a pesticide or herbicide that has been manufactured for use in relation to waters provided it is used at a concentration not exceeding a maximum concentration specified by the manufacturer or by law

Under section 182(7) of the *Natural Resources Management Act 2004*, local NRM authorities

have a statutory obligation to control declared weeds on road reserves, and may recover the costs of this work from owners of the adjoining land. This continues the arrangements in place under the former Animal and Plant Control (Agricultural Protection and Other Purposes) Act 1986. Landowners require written permission from the local council to carry out weed control or any other vegetation destruction on a road reserve.

Contaminating off-target land, plants or animals, both within and outside your property, may breach your general duty under s5 of the AGVET Control of Use Act (see section 3.3.1).

Pesticide use that damages native vegetation, including on your property, may be an offence under the Native Vegetation Act 1991 (Department of Environment Water and Natural Resources).

6.6.3 How to reduce the chances of spray drift and other off-target escape

Spray drift is the most visible type of off-target escape but transport in waters or movement through soils may also cause environmental harm. Escape via these pathways may be possible for a significant length of time after application.

Following is a summary of some useful strategies for reducing off-target impacts. For a more detailed treatment of these issues see:

- the EPA *Commercial Spray Operator Guideline*¹²
- the PIRSA fact sheets *How to avoid spray drift* and *Working together to minimise chemical spray drift* at www.pir.sa.gov.au/factsheets
- the excellent book by the Primary Industries Standing Committee, *Spray drift management—Principles, strategies and supporting information*, available from CSIRO publishing at www.publish.csiro.au.

Property management

Sound property management and farm planning will minimise spray drift problems before you plant a crop. Effective planning—including the locations and types of crops, planting of vegetation barriers, and establishment of buffer zones between crops and sensitive areas—makes it easier to prevent spray drift causing problems.

Preparing plans for spraying operations will help you avoid spraying in risky situations. Identify and map sensitive areas, waterbodies, crops and buildings both on and near your property. This will allow you to develop a 'spray drift awareness zone'. Once you know which sensitive areas may be at risk, you can take steps to minimise the chance of contaminating them. If you use a contractor to apply pesticides, ensure they have a copy of your spray plan and a map of any watercourses where spraying is to be carried out.

Equipment and application methods

Make sure you use a suitable application method for your situation. Targeted application methods, such as cut and swab or painting herbicides onto plants, and baits or traps for animals, will reduce the risk of off-target impacts. Backpack spraying is more precise than mechanised ground spraying, which in turn is more precise than aerial spraying. Match the precision of your application method to the scale of your job. If you are working in a sensitive area choose a more targeted application method—this will reduce the chance of off-target impacts.

¹² At the time of publication this guideline is still in preparation; call the EPA for information.

Minimise the chance of drift by making sure you are using appropriate spray nozzles, spray pressures and release heights for airblast, ground rig and aerial spraying. Generating the correct droplet size for your situation will minimise the risk of spray drift. A discussion on the details of the numerous spray application technologies available is beyond the scope of this guideline. See *Spray drift management—Principles, strategies and supporting information* (Primary Industries Standing Committee 2002) and section 6.5.2 for further references on this issue.

Pesticide choice

Consider the physical and chemical properties of the selected pesticide. Different products have varying spray drift potential, depending on the type of active ingredient and formulation. If possible choose pesticide formulations that are less likely to drift. Also avoid pesticides with a long residual effect—if they move off-target they have the potential to cause harm for a longer period than do pesticides with a short half-life.

If you have sensitive areas nearby, choose a product that is less likely to cause harm and one that is less likely to drift. For example, herbicides containing ethyl or butyl esters of 2,4-D are highly volatile, drift easily and can have a substantial impact on grapevines and other susceptible crops. Choose lower risk products if you are spraying in higher risk locations.

Weather

Only conduct spraying when weather and atmospheric conditions are suitable. Make sure you have appropriate equipment for measuring weather conditions. Low cost hand-held weather meters are available to measure temperature, humidity, atmospheric stability, and wind speed and direction. Wind socks can also be used as indicators of wind speed and direction and smoke generating devices can be used to assess atmospheric stability.

The Australian Government Bureau of Meteorology (BoM) has produced a pamphlet, *Weather for pesticide spraying* that provides additional information regarding ground spraying and weather conditions. This pamphlet can be obtained from BoM offices. In addition, daily updates of spraying conditions around South Australia can be found on the BoM web site www.bom.gov.au/announcements/ag_bulletins.shtml.

Monitor the weather conditions; if they deteriorate you should be prepared to postpone your spray operation to a more suitable time.

- To reduce the chance of pesticides being washed off-target and into waterways, you should not apply them when there is rain forecast or when soils are already wet. Rain can also reduce the effectiveness of an application.
- Drift will be reduced when temperatures are mild and humidity is higher. Try to spray when there are consistent light winds of 3-15kph blowing away from sensitive areas.
- Avoid spraying in low humidity and with temperatures above 27°C as spray droplet size will decrease due to evaporation, increasing the likelihood of drift. More volatile chemicals may also vaporise and re-enter the atmosphere. These conditions can also lead to inversion layers and unstable atmospheric conditions, greatly increasing the chance of drift.
- Avoid very calm conditions, in which drift will be unpredictable, or strong winds, which may carry spray a long way.

6.6.4 Contamination of soils on or off your property

While you can apply pesticides as a part of managing land for a particular use such as agriculture, you should consider the potential for contaminating your land both now and in the future (see section 4.4).

- Ideally apply pesticides when your IPM plan triggers their use, rather than routinely. Only apply at the rates specified on the label. Less frequent application will reduce the risk of soil contamination.
- Choose pesticides that have low residual effects. If a pesticide breaks down quickly there will be less chance of long-term contamination.

6.6.5 Communicating with neighbours

There are good reasons to communicate with your neighbours about your pesticide application. Effective communication can prevent misunderstanding and unnecessary conflict, and provide reassurance.

Discussion with neighbours will help determine any concerns they have and identify any sensitive areas on their property, and allow you to develop strategies to minimise the risk of damage. Once you have a plan discuss the details of your pesticide application, including your plans to minimise spray drift, with your neighbours.

If you wish to use herbicides to control weeds along boundary lines such as fences, gain the permission of the adjoining landholder first.

The application of pesticides to properties other than your own without the landholder's approval may be a breach of your general environmental duty (s25 of the Act, see section 3.2.1).

There are provisions in the AGVET Control of Use Act allowing for future regulations to control notification of neighbours. At the time of publication no regulations have been drafted on this topic.

6.6.6 Chemical control areas

Chemical control areas can be set up under the AGVET Control of Use Act. Pesticide application in these areas can be restricted on the basis of pesticide type, application method and time of year. At the time of publication no chemical control areas have been proclaimed.

6.7 Cleaning equipment and disposing of unwanted pesticides

Pesticides can cause significant harm to the environment if disposed of carelessly. Disposal of pesticide wastes can also be costly and time consuming so minimise the production of wastes. Follow these steps in the waste hierarchy.

Avoid or minimise the production of wastes: For example, buy only what you will use.

Reuse wastes: For example, if possible use washwater to make up the next batch of pesticide mix.

Recycle wastes: If safe and appropriate use washwater to irrigate crops or trees.

Dispose of wastes: If you do end up with unused pesticides or pesticide waste, store it safely until you can dispose of it in a safe and legal manner.

If you produce pesticide wastes you have a responsibility to deal with them in a safe and legal manner. This may take time and effort and come at a financial cost. These costs can be reduced through careful planning and implementation of strategies that produce less waste when you are using pesticides. You can also reduce overall pesticide use, and therefore waste production, by using non-chemical methods. Use of pesticides within an IPM framework should also lead to a reduction in use (see section 8.1.3).

A person must not dispose of a pesticide in contravention of a mandatory label instruction unless authorised by a permit (s7 of the AGVET Control of Use Act).

If you are cleaning up a pesticide that is a prescribed hazardous substance you must follow the requirements of your SOP (chapter 4 of the WHS Regulations, see section 6.3.3 for details).

When cleaning up and disposing of wastes follow the safety instructions on the label and the SDS. Always wear appropriate protective equipment.

6.7.1 Clean-up

Always clean equipment in a safe location where accidental spills can be contained and removed safely if required. Without careful management clean-up sites can become contaminated and you should consider the consequences of contamination (see section 4.4).

If you use pesticides regularly you should organise a dedicated location for preparation and clean-up. This should preferably be a bunded area on an impervious surface, such as a concrete slab, that drains to a sump where waste and spills can be collected. Do not clean up in a location where wastewater might enter a drainage line, a waterbody or a stormwater system.

Allowing pesticide to enter waters is an offence under clause 9 of the Water Quality Policy (see section 3.2.3).

6.7.2 Disposal of pesticide wastes

Pesticide wastes fall into three categories:

- washings and rinsate
- empty containers
- full-strength products, including unused spray mix and concentrates.

These are subject to different disposal requirements. Do not mix incompatible chemical wastes—it places you at risk as mixing incompatible chemicals can lead to dangerous chemical reactions and will make disposal of the chemicals more difficult.

6.7.3 Disposal of washings and rinsate

Clean-up may produce washings or rinsate that are contaminated with diluted pesticides. Unused full-strength pesticides, spray mix or concentrated product are not washings: see below for information on disposal of these.

There are five options when dealing with pesticide washings and rinsate.

1. Do not produce washings or rinsate—this is the ideal solution. While this may not always be possible in a commercial environment, you can work to minimise the amount of washings you do produce.

2. If you do generate washings or rinsate, reuse them to make up spray mix.
3. Dispose of washings and rinsate in a safe way on your own property. If you have a suitable area you can spray them onto the ground. Do not spray to the point where runoff occurs and do not apply washings near sensitive areas or waters. Do not spray onto areas that stock, pets or children have access to.
4. Dispose of washings and rinsate at an authorised waste depot or via a waste contractor.
5. Use a commercial spray contractor who deals with wastes as part of their service.

Allowing pesticide wastes to escape from your property may be a breach of your general environmental duty (s25 of the Act). Therefore, you should not apply washwater along boundary fence lines unless you have the permission of the adjoining landowner. Also, you must not apply washwater to an area where it will run off into waterways, drainage lines or stormwater systems (clause 9 of the Water Quality Policy). See section 3.2 for further information.

6.7.4 Disposal of empty containers

Ideally purchase pesticides in containers that minimise waste. The best options for containers are as follows.

- Purchase chemicals in refillable containers and return them to the supplier when you have emptied them.
- Dispose of containers through a disposal program such as drumMUSTER (see below).
- If your containers are not eligible for the drumMUSTER program, triple-rinse them, puncture and crush them, and dispose of according to the label instructions or via a commercial waste contractor.

You must not incinerate or burn pesticide containers as this is a breach of your general environmental duty (s25 of the Act) and may also be very dangerous. See section 3.2.1 for further information.

The drumMUSTER program

The national drumMUSTER program collects and recycles empty, cleaned, non-returnable pesticide containers, which must be cleaned to a required standard before collection. For product eligibility, cleaning requirements and collection timetables see the drumMUSTER web site www.drummuster.com.au, or call (02) 6230 6712.

6.7.5 Disposal of unwanted pesticides

If you have registered pesticides that are unwanted you could consider if anyone you know may have a use for them. Family, friends, neighbours or community groups may be able to use them. It is important that you only pass on registered pesticides with intact labels so they can be used in an appropriate way.

If you have unwanted pesticides that cannot be safely or legally used by others, there are a number of options for disposal.

- The EPA and Zero Waste SA both run free services for farmers to dispose of unwanted pesticides, including unregistered pesticides.

- ChemClear—this chemical waste disposal program has been developed by Avcare (the National Association for Crop Production and Animal Health) and the Veterinary Manufacturers and Distributors Association (VMDA), in association with the National Farmers' Federation. They provide a free service for some chemicals and will collect others at a cost.
- You can use a commercial waste contractor.

EPA's Hazardous Household Waste Depot and Zero Waste SA collections

The EPA's Hazardous Household Waste Depot is a service provided for householders and farmers to dispose of hazardous wastes, such as pesticides, free of charge. The depot is located at the corner of Magazine Road and Henschke Street, Dry Creek.

The depot is open on the first Tuesday of every month (excluding public holidays) between 9.00 am and midday. Special weekend openings are also arranged each year and alternative arrangements may be made for country patrons. For further information see the EPA's web site www.epa.sa.gov.au or call (08) 8204 2004 (Freecall 1800 623 445 for country callers).

Zero Waste SA also runs collections of household hazardous waste around the state in conjunction with local councils. See their web site www.zerowaste.sa.gov.au for a collection timetable or call (08) 8204 2051 for further information.

Neither service accepts empty containers or wastes from government or business.

ChemClear

ChemClear sets up collection depots nationally to remove unwanted pesticides. They collect some chemicals at no charge and others at a cost.

- Group 1 chemicals are collected at no charge. These are chemicals sold by member companies of Avcare or VMDA. They must be registered products or products whose registration or permit ceased since the last ChemCollect or ChemClear collection.
- Group 2 chemicals are collected for a fee. They include agricultural and veterinary chemicals whose registration has expired more than two years ago, including organochlorine and arsenical insecticides, or farm chemical products from companies who are not members of Avcare or the VMDA.

If you have unwanted chemicals you can register them for collection on the ChemClear web site www.chemclear.com.au or call 1800 008 182. See the web site or contact ChemClear for further information on the conditions of the program, including the cost of disposal of group 2 chemicals.

Commercial waste management

If you have business or commercial wastes to dispose of that are not accepted by the EPA or Zero Waste SA, and the ChemClear service is not suitable, contact an authorised hazardous waste contractor. See the 'waste reduction and disposal services' section of the Yellow Pages for contact details.

How not to dispose of pesticide wastes

Disposing of pesticides in an unsafe manner may have serious consequences for the environment and for health and safety. The EPA considers the following actions a breach

of your general environmental duty (s25 of the Act), and they may also breach other provisions of environmental legislation, including clause 9 of the *Water Quality Policy* (see section 3.2 for further information). These actions may also be very dangerous.

- *You must not pour unused pesticides into drains or gutters, stormwater systems, drainage lines, watercourses, waterbodies, streams or ponds.*
- *You must not incinerate or burn pesticide wastes.*
- *You must not dump waste pesticides onto other people's property, including public land.*
- *You must not dispose of waste pesticides through the kerbside collection system or into street rubbish bins. This puts garbage collectors at risk and adds contamination to landfills.*

You are required to comply with mandatory label instructions (see section 6.4.6), and labels typically state 'Do not dispose of undiluted chemicals on site'. Do not, under any circumstances, bury unused pesticides on your own property because they can contaminate soil and leach into groundwater and stormwater.

Do not pour unwanted pesticides down the sink or toilet as they can interfere with sewage treatment processes. They may also eventually be released to the environment, via both septic tanks and mains sewer systems.

6.7.6 Pesticide waste transport

To dispose of pesticides at the EPA depot or the Zero Waste and ChemClear collection programs, you will have to transport the wastes to a collection centre. You are responsible for the safety of the waste pesticides during transport, so consider the following:

- Don't transport your chemicals together with food, consumer goods, pets or livestock.
- Always leave original labels on containers and keep chemicals in their original containers. You may attach your own label if the original has fallen off. However, only label the container if you are sure of the name of the chemical. Do not guess.
- Ensure containers are well sealed and pack them securely so they don't fall over or leak. Avoid transporting open or leaking containers—first seal them in another container such as a bucket with a lid or a plastic rubbish bin.
- Do not mix chemicals. Apart from making disposal difficult you are increasing your risk of being exposed to the chemical. In extreme cases, mixing of incompatible chemicals can lead to fire or explosion.
- Preferably transport chemicals in a trailer or utility, not in the passenger compartment of the car, where a fallen or leaking container may fill the interior with dangerous vapour. Travel with your car windows down if carrying flammable or odorous materials.

When transporting wastes you also have obligations under the *Environment Protection (Waste Management) Policy 1994*.

A person who transports waste on or in a vehicle must take all reasonable and practicable steps to cover, contain or secure the waste to ensure that it remains on or in the vehicle throughout the course of transportation (s6 of the Environment Protection (Waste Management) Policy).

Do you need an EPA licence?

Commercial operations that generate significant quantities of pesticide waste may need to be licensed as producers of listed waste. Contact the EPA's licensing section on (08) 8204 2058 for further details. A licensed producer of listed wastes is required to have all listed waste (including pesticides) collected by a licensed waste transporter.

6.8 Training, licensing and record keeping

6.8.1 Education and training

New technology and continual improvements in pest control methods provide real opportunities for better pest control. Systems such as IPM (section 6.1.3) and EMS (section 6.1.5) provide a framework for optimal pest control with reduced risks. Keeping up to date and using the best pest control options will lead to:

- better pest control and better quality produce
- lower costs, less waste and a reduced risk of harm to the environment
- reduced health risks to pesticide users, bystanders and neighbours.

State and federal government agricultural departments also provide information on pests and pest management including:

- fact sheets from PIRSA and SARDI at www.pir.sa.gov.au/factsheets
- pest note sheets from the Victorian Department of Primary Industries web site www.dpi.vic.gov.au
- pest notes from the Federal Department of Agriculture Fisheries and Forestry web site www.affa.gov.au.

The PIRSA Roseworthy Information Centre has a range of publications on pests and other issues, and details are in their annual catalogue. Contact them on 1800 356 446 or see their web site www.ruralsolutions.sa.gov.au/bookshop. They also distribute PrimeNotes¹³, an extensive CD-R collation of over 5000 notes and fact sheets on primary industry and natural resource management issues.

There is a wealth of information available from other credible Internet sources, both electronic material you can often download at no cost and publications such as pest guides which you can purchase. In addition, your industry association may be able to provide information on effective management of different pests and diseases.

To ensure that you use pesticides safely you should also inform yourself about the product you are using and use it in an appropriate manner. Reading the label and SDS is an essential start. If you are a regular pesticide user you should consider formal training. ChemCert offers two-day training courses in the use of farm chemicals. See their web site www.chemcert.org.au for details.

6.8.2 Licensing for commercial application

If you apply pesticides for fee or reward, you are deemed to be running a pest control business under the Controlled Substances Pesticide Regulations. To run such a business

¹³ Published by the Queensland Department of Primary Industries and Fisheries

you require at least one of the following licences (s6 of the Controlled Substances Pesticide Regulations, DH Environmental Health Service).

Pest controller's licence—required by each person operating a business that applies pesticides for profit or reward, including ground based or aerial application.

Pest management technician's licence—required by people employed to apply pesticides by the holder of a pest controller's licence.

Some occupations, such as landscapers, gardeners and turf contractors, use pesticides as part of their work but are not primarily pest controllers—these users may also require a licence.

However, under s5 of the Controlled Substances Pesticide Regulations, users applying glyphosate with hand-held equipment are exempt from requiring a licence as long as any tank used has a maximum capacity of 15 litres or less. If your use falls entirely into this category, you may be exempt from requiring a licence.

For further information contact the DH Environmental Health Service on (08) 8226 7100 or by e-mail at public.health@health.sa.gov.au.

6.8.3 Requirements of training or qualifications for the purchase and use of certain pesticides

Sellers of pesticides must only supply Schedule 7 products to buyers who have appropriate training or certain qualifications. The prohibition is on the use of certain poisons for certain purposes. For the purposes of s27 of the Act, a person must not:

sell, supply, purchase or use a Schedule 7 poison for a domestic, or domestic gardening, purpose.

Under the *Controlled Substances (Poisons) Regulations 1996* (DH Environmental Health Service):

You cannot sell a pesticide that is a Schedule 7 poison unless the purchaser has ChemCert accreditation or an equivalent, or a pest controller's licence (s15 of the Controlled Substances Poisons Regulations).

The use of certain toxic pesticides, including Schedule 7 poisons, requires the successful completion of an appropriate training course and/or certain qualifications; see the PIRSA Rural Chemicals web site www.pir.sa.gov.au/ruralchem for an updated list of approved qualifications. Under s31 of the AGVET Control of Use Regulations (PIRSA Rural Chemicals Program):

You must not use pesticides that are Schedule 7 poisons or products containing mevinphos, endosulfan or acrolein unless you have ChemCert accreditation or other qualification approved by the Minister (s31 of the AGVET Control of Use Regulations).

There are also restrictions on the use of pre-construction termiticides containing bifenthrin or chlorpyrifos; and on the use of pesticide concentrates containing pindone or sodium monofluoroacetate (1080) for the preparation of baits. See Schedule 2 of the AGVET Control of Use Regulations for details.

6.8.4 Auditing of commercial spray operations

A spray audit procedure for commercial spray operators was developed in 1997 to ensure that participating commercial operators were using spray diaries correctly and maintaining the condition of spray equipment appropriately. The South Australian Agricultural Spray Contractors Association supports the audit procedure. Currently, numerous organisations including catchment water management boards, animal and plant control boards and some local government offices will only employ commercial spray contractors who hold a proof of audit certificate.

While the current audit procedure is limited to assessment of spray diaries and equipment condition, a guideline for 'Management of commercial spray operations and associated quality assurance' is under development. These products will provide ongoing support to employers and commercial spray contractors to ensure standards of competency are maintained.

Auditing of commercial spray operations ensures that the risk of pollution in the environment is minimised, and that both contractors and employers can be confident of satisfying their general environmental duty under s25 of the Act. Therefore, the EPA recommends that commercial spray operators be affiliated with the SA Agricultural Spray Contractors Association and undertake the audit procedure as required.

6.8.5 Keeping records

In conjunction with your spray management plan (see section 0), you should keep a record of each spraying operation. Record equipment settings and calibration reports, weather conditions, the area sprayed, chemicals used and spraying success. A written or computer record of pesticide jobs will provide information that will have a number of benefits.

- Records of pest activity and numbers, the timing and nature of control methods, application details and treatment success will help you make better pest control choices in the future.
- Careful records are a good defence against potential accusations of spray drift or chemical trespass.

Under Chapter 4 of the WHS Regulations (SafeWork SA), if you deal with prescribed hazardous substances you must keep records of the following:

- *all chemicals you store and use, along with an up-to-date copy of the SDS for each chemical*
- *your safe operating procedures (SOPs)*
- *any risk assessments, workplace monitoring or health surveillance you carry out*
- *all staff training (see section 6.3.3 for details).*

6.8.6 Records to be kept by pest controllers

Pest controllers have a number of obligations under s21 of the Controlled Substances Pesticide Regulations (DH Environmental Health Service).

For each application of pesticide in the course of the pest controller's business a pest controller must keep a record of:

- *the date, time and location of the application and the name and quantity of the*

pesticide applied

- *the name of the pest management technician who applied the pesticide*
- *the proximity of other people to the area where the pesticide was applied*
- *whether the pesticide was applied outdoors, and the prevailing weather conditions in the area where the pesticide was applied*
- *in the case of a termiticide applied to a site, the total surface area of the land or building treated with the termiticide.*

These records must be kept for seven years. There are also requirements for keeping records of staff employed as pest management technicians. See the regulations for further information.

6.9 Pesticide application and environmental noise

The generation of noise is an inherent by-product of many mechanised pesticide application methods. Noise from fan assisted sprayers and tractors has been measured at approximately 75-80 dB(A) within 20 metres of the equipment¹⁴. Noise generated by pesticide application may have an adverse impact on people in surrounding areas.

This section outlines your legal obligations with respect to noise, along with information on how to minimise the impact of your activities on others. See the EPA's information sheet *Environmental noise* for further advice.

6.9.1 Noise regulation

Noise is a pollutant under the Environment Protection Act, and the *Environment Protection (Noise) Policy 2008* sets out maximum noise levels for a range of land uses, including rural, commercial and industrial. It is important to note that these levels are established for reasonably steady and long-term noise sources, such as industrial process noise from a winery. They do not adequately account for short-term or transient noise sources and it is therefore not mandatory to achieve them in all situations.

This section provides a guide to how you can meet your general environmental duty with respect to noise generated by pesticide application and associated activity.

For the purposes of this guideline there are four land use classifications, as zoned by the relevant development plan.

- **Industrial** areas are those which primarily promote industrial activity.
- **Agricultural and viticultural** areas are those which primarily promote agriculture and primary production, including activities such as orchards, vineyards, broadacre cropping, market gardens, dairies and feedlots.
- **Township and residential** areas are those which primarily promote urban residential land use.
- **Rural living** areas are those which primarily promote rural residency, as opposed to primary production.

¹⁴ Spot checks carried out by the South Australian EPA

Areas zoned in different ways have different amenity requirements during the day and night. An indication of the noise levels that would comply with the general environmental duty for different zones is provided in Table 2.

Table 2 Indicative noise levels for day and night in different land use zones

Zone	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Industrial	70 dB(A)	70 dB(A)
Agricultural and viticultural	57 dB(A)	50 dB(A)
Township and residential	52 dB(A)	45 dB(A)
Rural living	47 dB(A)	40 dB(A)

If noise generated by your activity exceeds the specified levels on another person's property without their permission, you must take all reasonable and practicable measures to limit the impact of your activity. Failure to do so may breach your general environmental duty (s25 of the Act, see section 3.2.1).

In determining the extent of the reasonable and practicable measures you must take to ensure compliance, a range of factors are considered:

- the amount by which you have exceeded the indicative noise level
- the frequency of occurrence and duration of the noise
- alternative options available to you to the activity that is generating noise
- land use and development plan history in the vicinity
- financial, social and technical constraints
- the extent to which you have limited your impacts.

In the situation where your impacts cross over a zone boundary, the indicative noise levels in the above table are averaged.

6.9.2 How to limit your impact

Noise generated by pesticide users should not unreasonably interfere with the enjoyment of any area by other residents. When generating noise you should always be conscious of your effect on others. Night-time application, application with limited separation distances or applications where extreme noise levels are generated may require an extra effort to minimise conflict.

Communication

Communication is an important measure that is often overlooked and will usually help to minimise inconvenience and conflict over noise. Discussions with people who might be affected by the noise-generating activities may pre-empt complaints as they will be prepared for the noise and will have an expectation of its duration. This allows them to manage the impact of the noise and may allow you to schedule your application when it will cause the least problems for others—for example, by passing the closest location during the day rather than the early morning or night. Avoid subjecting your neighbours to sleep deprivation, which is certain to cause conflict and generate complaints. The World Health Organization suggests the potential onset of sleep disturbance occurs at noise levels in excess of 45 dB(A).

Maintaining your equipment

Ensure your equipment is well maintained and fitted with appropriate mufflers or noise reduction devices if possible. Complaints are often generated by neighbours exposed to noise that is different in character to other similar processes, or that they know could be substantially reduced by carrying out maintenance or using alternative equipment.

Separation distances in primary production zones

Dwellings exist in primary production zones but the amenity of such a zone is different from that of a rural living or residential land use area. In such a zone substantially higher levels of noise are allowed compared to township and rural living (Table 2). Notwithstanding this, the general environmental duty to minimise or prevent impacts on others is still incumbent on the pesticide user.

As a 'rule of thumb', to comply with the general environmental duty it is recommended the communication, maintenance and noise reduction measures described above be taken for any pesticide application occurring within 300 m¹⁵ of a dwelling in a primary production zone.

Separation distances in rural living zones

As a 'rule of thumb', to comply with the general environmental duty it is recommended the communication, maintenance and noise reduction measures described above be taken for any pesticide application occurring within 600 m¹⁶ of a dwelling in a rural living or residential zone.

¹⁵ The noise level is dependent on a range of meteorological and topographical influences that can make a substantial difference. The distances do not apply to louder methods, such as aerial spraying.

¹⁶ The noise level is dependent on a range of meteorological and topographical influences that can make a substantial difference.

7 ACCIDENTS, EMERGENCY SITUATIONS AND REPORTING OFFENCES

If a person who has been exposed to pesticides has collapsed, is not breathing or is in a life-threatening situation, call 000 for an ambulance.

If a person has been exposed to pesticides but is not in a life-threatening situation, call the Poisons Information Centre on 13 11 26 anywhere in Australia, 24 hours a day, 7 days a week.

7.1 Incidents

7.1.1 Preparation in case you have an incident

The level of planning and preparation required to prevent an incident such as a pesticide spill, or to deal with one if it occurs, will vary depending on the nature and amount of pesticides you use. You should:

- develop an emergency plan to deal with potential incidents, which includes ensuring that emergency services have access to relevant information on hazardous substances in the workplace
- have access to appropriate emergency equipment including protective clothing, and containment and clean-up equipment (see product label and SDS for details).

If you use prescribed hazardous substances in a workplace you will be required to plan and prepare for potential accident and emergency situations that may arise during the transport, storage, application and disposal of pesticides. This will include the provision of appropriate safety and clean-up equipment, along with training in its use.

If you are cleaning up a pesticide that is a prescribed hazardous substance you must follow the requirements of your SOP (chapter 4 of the WHS Regulations, see section 6.3.3).

7.1.2 Steps to take when responding to an incident

If you encounter an incident, first ensure your own safety and then the safety of others around you. If the incident is serious or beyond your ability to safely control it, call the emergency services.

- Move people a safe distance from the incident. Ensure your own and their safety. Contact the emergency services if required.
- Keep bystanders away from a spill.
- If it is safe to do so, contain the incident so the spill cannot spread.
- If a person who has been exposed to pesticides has collapsed, is not breathing or is in a life-threatening situation, call 000 for an ambulance.
- If someone has been exposed to a pesticide but is not in a life threatening situation, call the Poisons Information Centre on 13 11 26 anywhere in Australia, 24 hours a day, 7 days a week.
- Do not try to clean up a spill without appropriate safety equipment. Consult the product label or SDS for guidance. If required, contact appropriate personnel to perform further spill containment, clean-up and appropriate disposal of contaminated materials.

7.2 Reporting offences

7.2.1 Chemical trespass

Chemical trespass is when agricultural or veterinary chemicals (including pesticides) are used or disposed of in a manner that results in the chemical contaminating land, water, animals or plants outside the target area or causing harm to human health or the environment within or outside of the target area. Trespass may be due to mechanisms such as spray drift, overland flow or movement through soils.

If you are responsible for chemical trespass you have violated your general duty under the AGVET Control of Use Act. Failure to comply with this duty is not an offence but compliance with the duty may be enforced with a Compliance Order (see section 3.3.1). Trespass may also result in breaches of other legislation.

PIRSA is your first point of contact for chemical trespass incidents; they will inform other agencies, such as the EPA and DH, if required. For further information refer to the PIRSA Fact Sheet *Guidelines for Reporting Chemical Trespass Incidents*, available from www.pir.sa.gov.au/ruralchem. Contact the PIRSA Chemical Trespass Coordinator— telephone (08) 8226 0528, fax (08) 8226 1844, or e-mail PIRSA.ChemicalTrespass@saugov.sa.gov.au.

7.2.2 Reporting an incident of material or serious environmental harm

The EPA needs to know about serious incidents so it can ensure that the potential for environmental harm is minimised. Under s83 of the Act:

You must notify the EPA 'as soon as reasonably practicable' if you are responsible for an incident that has actually caused, or may potentially cause, serious or material environmental harm (see section 8.2 for definition of these terms). You must supply the EPA with details of the location, time, date and nature of the incident along with the action taken to deal with it.

What is 'as soon as reasonably practicable'? This depends on the circumstances and potential consequences of each incident. In many cases you should report such an incident immediately; in any case the EPA would expect to be notified within two hours of your becoming aware that an incident of this type has occurred.

To contact the EPA to report any incident, call (08) 8204 2004 (24 hours a day, 7 days a week). If you are a person or company authorised by the EPA to conduct a prescribed activity, call 1800 100 833.

Why am I required to report this type of incident?

Early intervention and clean-up of incidents such as pesticide spills will often reduce the harm caused by such events. Prompt notification allows the EPA to ensure that incidents are dealt with effectively and any risk to the environment and human safety is minimised.

Ultimately, if there is a delay in reporting an incident to the EPA, a court of law may be required to decide whether or not that delay was justified in the circumstances. If failure to report an incident in a timely manner leads to greater environmental harm, the consequences are likely to be substantial. The maximum penalties for failing to

report such incidents—\$150,000 for an individual and \$250,000 for a corporate body – reflect the serious nature of failure to report.

7.2.3 Requirement for pest controllers to report spills

Pest controllers and pest control technicians are also obliged to report certain types of incidents under s20 of the Controlled Substances Pesticide Regulations.

If a person who holds a licence under the Controlled Substances Pesticide Regulations observes a spillage of pesticide that, because of its magnitude or location, or because of the toxicity of the pesticide involved, may have an immediate impact on the environment or the health or safety of members of the public, or requires assistance to be managed, then the person must immediately report the spillage to the DH Environmental Health Service or a police officer.

To report such an incident contact the environmental health unit of DH on (08) 8226 7106 or the police on 131 444.

7.2.4 Notification of certain occurrences in the workplace

For immediately notifiable work-related injuries and notifiable dangerous occurrences involving exposure to hazardous substances that occur in the workplace, SafeWork SA must be notified under division 6.6 of the WHS Regulations.

If a work related injury occurs at a workplace:

- *The employer must notify SafeWork SA by telephone or facsimile as soon as practicable after the occurrence of the injury.*

If a notifiable dangerous occurrence occurs at a workplace, the person in charge of the workplace must give notice of the occurrence as follows:

- *The person must give preliminary notice of the occurrence by contacting SafeWork SA by telephone or facsimile as soon as practicable after it occurs; and*
- *The person must give written notice of the occurrence by sending to SafeWork SA a notice containing the information required within 24 hours after it occurs.*

SafeWork SA can be contacted on the emergency number 1800 777 209 (24 hours) or by e-mail at help@safework.sa.gov.au. See [section 10](#) for further contact details.

8 ABBREVIATIONS AND DEFINITIONS

8.1 Abbreviations

APVMA	Australian Pesticides and Veterinary Medicines Authority
BoM	Bureau of Meteorology
CCA	copper chrome arsenate (timber preservative pesticide)
CoP	code of practice
DPC	Department for Premier and Cabinet
dB(A)	decibels, A weighted
DEWNR	Department of Environment, Water and Natural Resources
DH	(South Australian) Department of Health
EMS	environmental management system
EPA	Environment Protection Authority
EPO	Environment Protection Order
EPP	Environment Protection Policy
IPM	integrated pest management
SDS	safety data sheet
NOHSC	National Occupational Health and Safety Commission
NRA	National Registration Authority
NRS	National Registration Scheme
WHS	work health and safety
PG	packing group
PIRSA	Primary Industries and Resources SA
PPE	personal protective equipment
SOP	safe operating procedure
the Act	<i>Environment Protection Act 1993</i>
Water Quality Policy	<i>Environment Protection (Water Quality) Policy 2015</i>

8.2 Definitions

active ingredient/active constituent	the substance or substances in a pesticide product which are primarily responsible for the biological or other effects that make the product work as a pesticide
agricultural and commercial pesticides	pesticides mainly used by pest management technicians or primary producers, available through specialist outlets in large volume containers and concentrated form; may be highly toxic (e.g. Schedule 7 poisons) and hazardous to the environment and human health; have specific label instructions, many of which are mandatory, covering the pest, crop and methods of use and disposal (also see domestic pest control products)
application rate	amount of pesticide product applied, often expressed as a volume of product or active ingredient per unit area (e.g. grams per square metre)
biological control	method of controlling a pest using another organism such as a predator, parasite or disease
broad-spectrum pesticide	pesticide that affects a wide range of organisms (also see selective pesticide)
buffer zone	zone around a pesticide application target area that captures off-target pesticide movement so it does not have an impact on more sensitive areas such as waterbodies, native vegetation or neighbouring properties
bund	an embankment or wall of concrete or other impervious material designed to contain spills of liquids used, stored or processed above ground
calendar approach	an undesirable method of pesticide application where routine application of pesticides is based on time of year or crop maturity, rather than on need as determined by monitoring or observation (also see integrated pest management)
calibrate	to measure the output of pesticide application equipment
chemical control areas	areas where the use of pesticides can be restricted by type, season and application method as designated under the <i>Agricultural and Veterinary Products (Control of Use) Act 2002</i>
chemical trespass	when agricultural or veterinary chemicals (including pesticides) are used or disposed of in a manner that results in the chemical contaminating land, water, animals or plants outside the target area, or causing harm to human health or the environment within or outside the target area; trespass can result from spray drift, overland transport due to water or erosion, and movement through soils
Class 3 dangerous substances	flammable dangerous substances—some pesticides have a flammable solvent base
Class 6 dangerous substances	toxic dangerous substances including many pesticides
common law duty of care	your obligation under common law to ensure that no harm is done to yourself, or to any other person or their property
contamination	the addition of any chemical substance or waste to land or water that increases the concentration of the substance above background levels and represents, or potentially represents, an adverse impact on the environment or human health

dangerous goods/ dangerous substances	any substance or article that is toxic, corrosive, flammable or otherwise dangerous and declared by the <i>Dangerous Substances Regulations 2002</i> to be a dangerous substance, or determined by a competent authority in accordance with these regulations to be dangerous goods
dB(A)	the noise level in decibels obtained using the (A) weighted network of a noise level
domestic pest control products/home garden products	pesticides that are available to the public at normal retail outlets, including those for use indoors, in gardens and on other areas around private dwellings; used for the control of diseases, insect pests and weeds as well as snails, slugs and rodents (also see agricultural and commercial pesticides)
ecologically sustainable development	development that uses, conserves and enhances the community's resources in a way that allows ecological processes, on which life and biodiversity depend, to be maintained, and the total quality of life now and in the future to be increased
environmental harm	any harm, or potential harm, to the environment of whatever degree or duration; includes serious environmental harm, material environmental harm and environmental nuisance
environmental management systems (EMS)	management systems that minimise environmental harm by identifying environmental impacts, setting performance targets, establishing means of achieving targets, detailing monitoring or auditing to show if targets have been reached, and maintaining records of actions and progress
environmental nuisance	any adverse effect on the amenity value of an area caused by noise, smoke, dust, fumes or odour which is actually or likely to unreasonably interfere with the enjoyment of the area; or any unsightly or offensive condition caused by waste
Environment Protection Order	an environment protection order issued under s93 of the <i>Environment Protection Act 1993</i>
general environmental duty	as defined in s25 of the Environment Protection Act: A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm or nuisance.
half-life	the time it takes a substance to break down to half its original concentration—the standard way to describe how long pesticides take to break down in the environment
hazardous substance	a substance that is listed on the National Occupational Health and Safety Commission's (NOHSC's) list of designated hazardous substances, or a substance that is determined to be a hazardous substance by the manufacturer or importer of the substance on the basis of the NOHSC's approved criteria for classifying hazardous substances
home garden products	see domestic pest control products
integrated pest management (IPM)	a strategy that aims for long-term prevention of pest problems through techniques including biological control, use of resistant varieties, good crop hygiene and cultural practices; within IPM, pesticides are only used when monitoring indicates they are needed, rather than on a calendar basis

label instructions	APVMA-approved written or graphic instructions on a label or in a leaflet, pamphlet or booklet provided with a pesticide product; may provide information on safety, use and disposal of pesticides, along with active constituents and other ingredients; may be mandatory
listed waste	any waste listed in Schedule 1, Part B of the Environment Protection Act
material environmental harm	environmental nuisance of a high impact or on a wide scale; or actual or potential harm to the health or safety of human beings that is not trivial; or other actual or potential environmental harm that is not trivial; or harm that results in actual or potential loss or property damage of an amount exceeding \$5000
non-target organisms	a species that a control action, such as pesticide application, is not intended to destroy
off-label use	use of a pesticide in a manner that is not described on the registered label or permit
off-target	application of a pesticide, either deliberately or accidentally, to an area where it is not required
packing group	method of describing dangerous substances—PGI are goods of great danger, PGII are goods of medium danger and PGIII are goods of small danger
personal protective equipment	refers to the equipment worn by workers to reduce their exposure to hazards; includes protective items for the eyes (goggles, glasses), ears (ear plugs, ear muffs), respiratory system (respirators, face masks, cartridge filters), feet (safety boots), head (hard hats) and body (aprons, safety harnesses)
pest	a living organism that degrades the health, value, utility, condition or amenity of another organism, a structure or a place
pesticide	a substance or organism used to eliminate, incapacitate, inhibit growth of or repel pests; can be made from natural or synthetic chemicals; some living organisms that act as biological control agents can be pesticides
pesticide resistance	genetic predisposition of an organism that allows it to survive a pesticide application at doses that kill, or once killed, most individuals of the same species
pesticide resistance management groups	a method of classifying pesticides based on their mode of action, allowing the use of rotational strategies when selecting pesticides in order to minimise the chance of resistance development
pesticide waste	any waste that contains pesticides including unused and unwanted full strength product, unwanted spray mix, washings or spillage (see waste)
poison scheduling	a classification of the toxicity of substances by the National Drugs and Poisons Schedule Committee according to the <i>Therapeutic Goods Act 1989</i> and the <i>Therapeutic Goods Regulations 1990</i>

precautionary principle	states that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of this principle, public and private decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and by an assessment of the risk-weighted consequences of various options.
safe operating procedure (SOP)	a procedure developed for safely dealing with a hazardous substance, situation or activity in a workplace
safety data sheet (SDS)	document prepared by the manufacturer or importer of a hazardous chemical which provides information about the physical, chemical and biological properties of that product, along with any potential health and physical hazards associated with the product
Schedule 5 poisons	substances which have low toxicity or a low concentration; have a low to moderate hazard; are capable of causing only minor adverse effects to human beings in normal use; and require caution in handling, storage or use; they have the heading 'CAUTION'—'Keep Out Of Reach Of Children' 'Read Safety Directions Before Opening Or Using' on the label
Schedule 6 poisons	substances with a moderate toxicity rating which may cause death or severe injury if they are ingested, inhaled or come into contact with the skin or eyes; they have the heading 'POISON'—'Keep Out Of Reach Of Children' 'Not To Be Taken' 'Read Safety Directions Before Opening or Using' on the label
Schedule 7 poisons	substances with a high toxicity rating which can cause death or severe injury at low exposures; require special precautions in their manufacture, handling or use; may require special regulations restricting their availability, possession or use; are too hazardous for domestic use or use by untrained persons; they have the heading 'DANGEROUS POISON'—'Not To Be Taken' 'Keep Out Of Reach Of Children' 'Read Safety Directions Before Opening Or Using' 'Can Kill if Swallowed' on the label
serious environmental harm	actual or potential harm to the health or safety of human beings that is of a high impact or on a wide scale; or other actual or potential environmental harm that is of a high impact or on a wide scale; or harm that results in actual or potential loss or property damage of an amount exceeding \$50,000
registered product	a product that has been through the process of evaluation and approval by the APVMA, to which all agricultural and veterinary chemicals are subject prior to their sale to the end user; the process includes approval of the label
selective pesticide	a pesticide that affects only the target pest, or a limited group of related organisms, and does not harm most other organisms
spray drift	the movement of a pesticide to an off-target area by transport through the air in vapour, spray or droplet form
target area	the area where a pesticide user intends applying a pesticide for a legitimate purpose; does not include an area of application of a pesticide for the purpose of disposal
unregistered product	a product that has not passed through the APVMA's registration process, or historically has passed through the process but since been deregistered
unscheduled poison	a product that has a slight degree of hazard (lower toxicity rating) than a Schedule 5 product, but is registered as a pesticide through the APVMA. These products can have some wording on the label, e.g. 'keep out of reach of children'

waste	any liquid, solid or gas (or a combination thereof) that is left over, surplus or an unwanted by-product from any business or domestic activity, whether of value or not
workplace	any place (including any aircraft, ship or vehicle) where an employee or self-employed person works including any place where such a person goes while at work

9 FURTHER READING

The following references contain further information regarding pesticides.

9.1 EPA publications

EPA Guidelines

These and other publications are available from the publications section of the EPA web site www.epa.sa.gov.au/pub.html, by e-mail epainfo@epa.sa.gov.au, or by telephone (08) 8204 2004 (Freecall 1800 623 445 for country callers).

Bunding and spill management

Copper chromated arsenate (CCA) timber waste—storage and management

Disposal of backwash water from swimming pools

Environmental noise

Household hazardous waste—management and disposal

In preparation

Commercial spray operator guidelines

Environmental guidelines for pesticide use by urban and rural lifestyle landholders

9.2 Australian standards

Australian standards are available for purchase online at www.standards.com.au, by e-mail: sales@standards.com.au, by telephone: 1300 654 646; or by post: GPO Box 5420, Sydney, NSW 2001, Australia.

Australian Standard AS 1678.10.001-1998 *Emergency procedure guide—Transport—Pesticides*

Australian Standard AS 1940-1993 *The storage and handling of flammable and combustible liquids*

Australian Standard AS 2507-1998 *The storage and handling of agricultural and veterinary chemicals*

Australian Standard AS/NZS 3500.1.2-1998 *National plumbing and drainage—Water supply—Acceptable solutions*

Australian Standard AS 3660.1-2000 *Termite management—New building work*

Australian Standard AS 3660.2-2000 *Termite management—In and around existing buildings and structures*

9.3 Other publications

General

Environment Protection Authority 2001, *Assessment of the impact of insecticide spraying of Australian plague locusts*, EPA, Adelaide.

National Registration Authority 2001, *Code of practice for labelling agricultural chemical products*, Australian Pesticides & Veterinary Medicines Authority, Canberra.

O'Neill, G 2002, *Pesticide use in Australia, 'a community summary'* (booklet), Australian Academy of Technological Sciences and Engineering, Melbourne.

Primary Industries and Resources SA 2002, *Guidelines for reporting chemical trespass incidents*, Rural chemicals program, PIRSA, Adelaide.

QLD Department of Primary Industries and Fisheries 2004, *PrimeNotes* (CD-R), DPI&F publications, Brisbane.

Radcliffe, JC 2002, *Pesticide use in Australia...: Australian Academy of Technological Sciences and Engineering*. Melbourne

Rogers, P 1997, *Safer pest control for homes and gardens* (2nd edition), CHOICE, Sydney.

Rutherford, P 2002, *Code of practice for the use of agricultural and veterinary chemicals in Western Australia, 2nd edition*, WA Department of Agriculture, Perth.

South Australian Health Commission 1995, *South Australian Health Commission termiticides (safe use) code of practice*, South Australian Health Commission, Adelaide.

OHS&W

Buckett, KJ & Di Marco, PN 1997, *Pesticide use in schools and school grounds*, National Environmental Health Forum, Adelaide.

National Occupational Health and Safety Commission 1994a, *Guidance note for the assessment of health risks arising from the use of hazardous substances in the workplace*, NOHSC, Canberra.

—1994b, *National code of practice for the control of workplace hazardous substances*, NOHSC, Canberra.

National Road Transport Commission in conjunction with the Advisory Committee on the Transport of Dangerous Goods and the Federal Office of Road Safety 1998, *Australian code for the transport of dangerous goods by road and rail, 6th edition* (Australian Dangerous Goods Code), Australian Government Publishing Service, Canberra.

IPM and EMS

Llewellyn, R 2002, *Good Bug Book*, 2nd ed., Integrated Pest Management Pty Ltd, Mundubbera.

Crop spraying

Alcorn, G. 1993, *Crop spraying techniques and equipment*¹⁷, Inkata Press, Sydney.

Chemical Standards Branch, Department of Natural Resources and Environment 2002, *Code of practice for farm chemical spray application*, Department of Natural Resources and Environment, Melbourne.

Primary Industries Standing Committee. 2002, *Spray drift management*, CSIRO Publishing, Melbourne.

Brochures

Produced by the Bureau of Meteorology, and available from regional offices:

Weather for pesticide spraying

Produced by SafeWork SA. Available online at www.safework.sa.gov.au:

Major workplace hazards: Chemical use

Major workplace hazards: Pesticides

Major workplace hazards: Responsible use of chemicals

9.4 South Australian legislation

The following legislation is relevant to pesticide issues. South Australian legislation is available free of charge on the Internet from

www.parliament.sa.gov.au/dbsearch/legsearch.htm. All others are available from the Australasian Legal Information Institute at www.austlii.edu.au.

Copies of South Australian legislation are also available from the Service SA Government Information Centre: telephone 13 23 24; or online at www.shop.service.sa.gov.au.

State environmental legislation

The Environment Protection Act 1993

Environment Protection (Water Quality) Policy 2015

Environment Protection (Noise) Policy 2008

Native Vegetation Act 1991

Natural Resources Management Act 2004

Other state legislation

Agricultural and Veterinary Chemicals (South Australia) Act 1994

Agricultural and Veterinary Products (Control of Use) Act 2002

¹⁷ This older book provides good information on pest management and the principles of pesticide use, along with a discussion of various application technologies. However, some of the information on disposal of wastes contravenes laws regulating pesticides in South Australia, and the discussion of pesticide law is out of date.

Public and Environmental Health Act 1987

Controlled Substances Act 1984

Controlled Substances (Pesticides) Regulations 2003

Controlled Substances (Poisons) Regulations 1996

Work, Health and Safety Act 2012

Work, Health and Safety Regulations 2012

Approved code of practice for the control of workplace hazardous substances 1995

Dangerous Substances Act 1979

Dangerous Substances Regulations 2002

9.5 Commonwealth legislation

Agricultural and Veterinary Chemicals Code Act 1994

Agricultural and Veterinary Chemicals Act 1994

Agricultural and Veterinary Chemicals (Consequential Amendments) Act 1994

Agricultural and Veterinary Chemical Products (Collection of Levy) Act 1994

Agricultural and Veterinary Chemical Products Levy Imposition (Customs) Act 1994

Agricultural and Veterinary Chemical Products Levy Imposition (Excise) Act 1994

Agricultural and Veterinary Chemical Products Levy Imposition (General) Act 1994

9.6 Useful web site links on pests and pesticides and the environment

SA Government

www.environment.sa.gov.au/Home

www.epa.sa.gov.au/links.html

www.pir.sa.gov.au/index.shtml

www.sardi.sa.gov.au/horticulture/index.html

Other government web sites

www.agriculture.gov.au

www.apvma.gov.au

www.daff.gov.au

www.healthinsite.gov.au/topics/Pesticides

www.horticulture.com.au

Other useful non-government web sites

www.awri.com.au/agrochemicals

www.crcv.com.au

www.winetac.com.au

10 CONTACT DETAILS

Organisation	Telephone	E-mail/Internet
AGSAFE GPO Box 816 Canberra City ACT 2601	(02) 6230 4799	info@agsafe.com.au www.agsafe.com.au
APVMA (formerly the NRA) PO Box E240 Kingston ACT 2604	(02) 6272 5852	contact@apvma.gov.au www.apvma.gov.au
Avcare LIMITED Locked Bag 916 Canberra ACT 2601	(02) 6230 6399	info@avcare.org.au www.avcare.org.au
Bureau of Meteorology PO Box 421 Kent Town SA 5071	(08) 8366 2600	webclim@bom.gov.au www.bom.gov.au
ChemCert PO Box 646 Claire SA 5453	(08) 8842 4048	sa@chemcert.org.au www.chemcert.org.au (ChemCert Australia)
ChemClear GPO Box 816 Canberra City ACT 2601	1800 008 182	info@chemclear.com.au www.chemclear.com.au
SafeWork SA GPO Box 465 Adelaide SA 5001	1300 365 255	help@safework.sa.gov.au www.safework.sa.gov.au
DEWNR GPO Box 1047 Adelaide SA 5001	(08) 8204 1910	www.environment.sa.gov.au/ contact-us
DH Environmental Health Service PO Box 6 Rundle Mall Adelaide SA 5000	(08) 8226 7100	public.health@health.sa.gov.au www.dh.sa.gov.au
drumMUSTER GPO Box 816 Canberra City ACT 2601	(02) 6230 6712	drummuster@drummuster.com.au www.drummuster.com.au
EPA ¹⁸ GPO Box 2607 Adelaide SA 5001	(08) 8204 2004, or Freecall 1800 623 445 (non-metro callers)	epainfo@epa.sa.gov.au www.epa.sa.gov.au
Grain Research and Development Corporation PO Box 5367 Kingston ACT 2604	(02) 6272 5525	grdc@grdc.com.au www.grdc.com.au

¹⁸ Note: the SA EPA hazardous household waste depot is located at the corner of Magazine Road and Henschke Street, Dry Creek. The depot is open on the first Tuesday of every month (excluding public holidays) between 9.00 am and midday. Special weekend openings are arranged each year. Householders and farmers (not businesses) can dispose of the following hazardous wastes free of charge: pesticides, pharmaceuticals, solvents, thinners, paints, oils, fuels, batteries and unknown chemicals.

Organisation	Telephone	E-mail/Internet
Horticulture Australia Level 1, 50 Carrington St Sydney, 2000	(02) 8295 2300	info@horticulture.com.au www.horticulture.com.au
Mount Lofty Ranges Watershed Chemical Users Project c/o Torrens & Patawalonga CWMB 5 Greenhill Rd Wayville SA 5034	(08) 8271 9190	torpat@cwmb.sa.gov.au www.cwmb.sa.gov.au
PIRSA Rural Chemicals Program GPO Box 1671 Adelaide SA 5001	1300 799 684	pirsa.ruralchemicals@saugov.sa.gov.au www.pir.sa.gov.au/ruralchem
PIRSA Rural Solutions GPO Box 1671 Adelaide SA 5001	1300 364 322	info@ruralsolutions.sa.gov.au www.ruralsolutions.sa.gov.au
Poisons Information Centre	13 11 26	
SARDI - Horticulture Waite Research Precinct Entrance 2b, Hartley Grove Urrbrae	(08) 8303 9419	pirsa.sardi@saugov.sa.gov.au www.sardi.sa.gov.au
SMARTtrain GPO Box 1671 Adelaide SA 5001	(08) 8226 0392	johnson.meredie@saugov.sa.gov.au
Standards Australia GPO Box 5420 Sydney NSW 2001	1300 654 646	sales@standards.com.au www.standards.com.au

Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

Further information

Legislation

[Online legislation](#) is freely available. Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet

Adelaide Service SA Centre

108 North Terrace

Adelaide SA 5000

Telephone: 13 23 24

Facsimile: (08) 8204 1909

Website: shop.service.sa.gov.au

Email: ServiceSAcustomerservice@sa.gov.au

General information

Environment Protection Authority

GPO Box 2607

Adelaide SA 5001

Telephone: (08) 8204 2004

Facsimile: (08) 8124 4670

Freecall: 1800 623 445 (country)

Website: www.epa.sa.gov.au

Email: epainfo@epa.sa.gov.au
