

# **REGULATORY IMPACT STATEMENT**

**PROPOSED**

**PESTICIDES AMENDMENT (RECORDS)**

**REGULATION 2000**



**ENVIRONMENT PROTECTION AUTHORITY**

## **Submissions**

The Environment Protection Authority invites you to make written submissions on this Regulatory Impact Statement and on the proposed Pesticides Amendment (Records) Regulation 2000 (the proposed Regulation).

Submissions should be made in writing and sent to:

Director Chemicals Policy  
NSW Environment Protection Authority  
PO Box A290  
Sydney South 1232

Submissions will be accepted up until the close of business on 30 March 2001.

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## SUMMARY

The Environment Protection Authority (EPA) has proposed an amendment to the Pesticides Regulation 1995. The Pesticides Amendment (Records) Regulation 2000 proposes the introduction of mandatory record-keeping requirements by all people who use pesticides for commercial purposes. This Regulatory Impact Statement provides an analysis of the proposed Regulation as required by the *Subordinate Legislation Act 1989*.

This Regulatory Impact Statement describes a number of issues relating to pesticide use in NSW and identifies a need to increase the level of pesticide use record-keeping in NSW. The proposed objective is to introduce record-keeping requirements that will make a cost-effective contribution to:

- reducing the human health and environmental impacts of the use of pesticides through more effective and timely response to problems that arise
- reducing current risks or avoiding future risks to agricultural trade
- increasing the efficiency of pesticide use
- helping advance the objectives of the *Pesticides Act 1999* (the Pesticides Act).

Proposed minimum record-keeping standards for all commercial pesticide users are examined in the Regulatory Impact Statement through review of the merits of a range of options. The proposed standards are similar to existing record-keeping requirements or practices under:

- licences for aerial pesticide applicators, urban pest controllers and fumigators
- WorkCover codes of practice relating to pesticides
- existing voluntary industry quality assurance programs.

This Regulatory Impact Statement contains an evaluation of the proposed Regulation against the principal alternative, which is to continue with the current mix of:

- licensing certain commercial users
- preparing extension material such as the NSW WorkCover Authority's codes of practice, and
- pesticide users participating in industry quality assurance programs.

This Regulatory Impact Statement finds that both the costs and benefits of the proposed Regulation are likely to exceed those of the principal alternative, principally because the proposed Regulation will achieve a high level of record-keeping in a much shorter time than will the alternative.

The quantified incremental costs of the proposed Regulation compared with the base case are estimated at \$1.6 million a year, equivalent to a present cost of \$6.6 million over five years at a discount rate of 7%.

The quantified incremental benefits of the proposed Regulation are small, at about \$28,000 a year in reduced investigation time owing to more effective investigation of pesticide incidents. However, the proposed Regulation also returns unquantified benefits of:

- reduced risk of trade impacts due to improved compliance with the Pesticides Act and reduced violations of residue limits
- reduced risk of lowered agricultural production value due to reduced residue violations and reduced diseases or blemishes caused by over or under use of pesticides
- reduced incidence of environmental or health effects from pesticide use

- more efficient pesticide use and expenditures from improved understanding of pesticide use patterns and trends
- reduced costs and increased effectiveness of scientific studies on: the impacts of pesticides on human health or the environment; the effectiveness of specific pesticides against specific pests; and the establishment of residue limits for key chemical/commodity group combinations.

The major social benefits are reduced risk to trade and consumer welfare, and reduced risk of harm to human health and the environment through improved compliance with the Pesticides Act.

Effective use of records by pesticide users is also likely to return some private benefits to those users through greater confidence that agricultural production meets produce quality standards, better understanding of pesticide use patterns and purchase requirements, and easier identification of causes of production problems. It is expected that these benefits will include a reduction in pesticide expenditure without a corresponding loss of production—a potential saving of \$1.0 million to \$1.9 million a year for every 1% reduction in pesticide use that results from the proposed Regulation.

Other social benefits may also come about if records are available to reduce costs of research into the impacts of pesticides on the environment, human health, plants and animals protected by the pesticides, and/or the target pests.

At an industry level, the total cost of the proposed Regulation is estimated at about 0.06% of the value added by the agricultural sector in NSW, which is the largest sector affected by the proposed Regulation.

At an individual business level, it is estimated that the cost to most businesses and operators affected by the record-keeping requirements for the first time will be less than \$50 to \$80 a year, with the cost principally occurring as an opportunity cost of time that could be dedicated to other activities.

It is believed that the relatively low costs of the proposal to individual affected businesses and to the NSW economy will be significantly outweighed by benefits from better pesticide expenditure decisions, improved compliance with the Pesticides Act and a reduced risk of violation of residue limits.

The proposed Regulation has been assessed against the requirements of the Competition Principles Agreement and is believed to be consistent with the National Competition Policy.

We therefore conclude that the proposed Regulation should be made.

## INTRODUCTION

The Environment Protection Authority (EPA) proposes to amend the Pesticides Regulation 1995 to introduce new record-keeping requirements in connection with the use of pesticides for commercial purposes.

The proposed amendment will be made in accordance with section 119(2)(e) of the *Pesticides Act 1999* (the Pesticides Act). The principal proposed amendments are that:

- all people who use pesticides for commercial and other related purposes (including in agricultural or farming, forestry or aquaculture operations) must prepare and keep a record of each pesticide application they perform where the application is of a type specified in the amendment
- records must contain a number of details, including such things as the date and time of pesticide application, the type, rate and quantity of pesticide used, target pest, equipment used, receiving environment, weather conditions at the time of application and the precise location of the receiving environment
- records must be kept by pesticide users and occupiers of agricultural, forestry or farming premises where a pesticide was used
- records must be kept for at least three years
- records may be integrated with other record-keeping requirements
- penalty notice provisions apply to some of the new requirements.

The use of pesticides for non-commercial purposes will not be affected by the proposed Regulation, thereby excluding pesticide use that is domestic, minor in nature or incidental to the operation of a commercial business. In addition, for farming, forestry or agricultural operations, the proposed Regulation does not affect certain uses of pesticides that are considered to present a low environmental risk.

The proposed Regulation is set out in its entirety in Appendix 3.

Under the *Subordinate Legislation Act 1989*, the EPA is required to prepare an assessment of the economic, social and environmental costs and benefits of the proposal and its alternatives. The purpose of this analysis is to ensure that the proposed Regulation provides the greatest net benefit or the least net cost to the community compared with its alternatives.

The proposed Regulation is an amendment Regulation, therefore a Regulatory Impact Statement is not required under the Subordinate Legislation Act. However, because there is a high level of public interest in the issue of mandatory pesticide use record-keeping, the EPA has chosen to prepare this Regulatory Impact Statement in order to provide interested parties with an opportunity to make submissions on the proposed Regulation.

## Consultation on the proposed Regulation

The EPA has consulted the community widely on the preparation of the proposed Regulation to date. In particular, there has been:

- formal consultation with, and development of the proposed Regulation through, the Pesticides Implementation Committee at its scheduled meetings
- extensive consultation with individual stakeholder representatives on the Pesticides Implementation Committee out of session.

The availability of the Regulatory Impact Statement will be advertised in the *NSW Government Gazette*, *The Sydney Morning Herald*, *The Land* and other appropriate regional publications. The

Regulatory Impact Statement will be on display, and public submissions will be accepted until 30 March 2001.

In addition, the Regulatory Impact Statement will be distributed to the following groups to enable them to review and comment on the proposed Regulation:

- Nature Conservation Council
- Australian Chemical Trauma Alliance
- Rural Lands Protection Board State Council
- Avcare
- Chemcert NSW
- NSW Department of Urban Affairs and Planning
- NSW Department of Land and Water Conservation
- NSW National Parks and Wildlife Service
- NSW Department of Education and Training (TAFE)
- National Registration Authority for Agricultural and Veterinary Chemicals
- GrainCorp
- All organisations represented on the Pesticides Implementation Committee, namely:
  - Australian Aerial Agricultural Association
  - Australian Beef Association
  - Australian Environmental Pest Managers Association
  - Environment Protection Authority
  - Local Government and Shires Associations
  - NSW Agriculture
  - NSW Farmers' Association
  - NSW Health
  - State Catchment Management Coordinating Committee
  - Total Environment Centre
  - WorkCover NSW.

The EPA also plans to provide opportunities for any interested people, including representatives of communities with non-English-speaking backgrounds, to discuss particular details of the proposed Regulation.



## THE ISSUE

### Pesticide use by the commercial sector and public authorities in NSW

There are about 50,000 farms, plant nurseries, government agencies, local authorities, sports clubs and commercial pesticide applicators that use pesticides on a commercial scale in NSW.

These entities are estimated to make a minimum of between 600,000 and 900,000 separate pesticide applications each year (Appendix 1). This is divided into 250,000 to 500,000 applications in the agricultural, farming, forestry, sporting and public sectors, and 380,000 applications by urban pest controllers and fumigators.

Data provided by ABS (1996) shows that in 1991–92, over 700,000 L of herbicide, insecticide and fungicide were collectively applied to between 3.3 million and 4.5 million hectares of land in NSW. These statistics, although several years old, indicate the likely order of the volume of pesticides being applied in NSW at present.

### Benefits of pesticide use

The application of these pesticides provides significant benefits to NSW, such as:

- avoidance of yield loss in NSW agricultural industries. For example, in the case of grain, the saving could be as much as 15% on production valued at about \$2.6 billion (ABS 1997)
- prevention of plant and insect pests from out-competing or damaging native species in reserves, Landcare and Bushcare areas
- protection of structures (homes and businesses) from white ant damage
- avoidance of health and amenity impacts from other pests.

The order of magnitude of the private benefit of pesticide use in Australia is suggested by the value of pesticide sales. Data from the National Registration Authority for Agricultural and Veterinary Chemicals (NRA 1999) shows that the value of pesticide sales in Australia in 1998 exceeded \$1.5 billion, of which \$1.26 billion was for sales of herbicides, insecticides and fungicides<sup>1</sup>. Separate figures are not available for NSW, but the proportion of sales in NSW is likely to lie between 27% and 36%<sup>2</sup> of this value, that is, \$340 million to \$440 million a year. The value of damage to structures, agricultural produce and forests that can be avoided through use of these pesticides will be at least as great as the value of sales, if pesticides are being used rationally. While the value of the net benefit cannot be determined directly from the value of pesticide sales, sales of \$340 million to \$440 million a year are likely to indicate the existence of a significant welfare benefit.

### Actual or potential problems from pesticide use

The widespread use of pesticides in NSW can result in actual or potential problems if pesticides are used improperly or cause off-site effects, or if mistakes are made or accidents occur.

Examples are:

- incidences of human chemical poisonings in agriculture
- community concerns about potential health impacts

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<sup>1</sup> Excluding household insecticides

<sup>2</sup> NSW produces 27% of Australian agricultural production by value and represents 36% of the Australian economy (DSRD 2000).

- production losses (for example, crop damage) on-farm
- impacts on native fauna and flora, including aquatic life
- produce or food residue level violations and consequent trade impacts.

These can occur from chemical handling and use, spray drift, contaminated run-off, use of inadequate withholding periods, use of deregistered chemicals, or inappropriate chemical use (for example, contrary to label instructions).

## **Pesticide use record-keeping to address actual or potential problems**

Investigations into pesticide use problems are helped greatly if there are proper records of pesticide use.

Between 1 January 1996 and 31 December 1999, EPA pesticide inspectors reported on 917 serious pesticide incidents that required detailed consideration before they could be resolved. About 100 of these incidents appeared to be wilful misuse (for example, tree poisoning) for which no records would have been made, and 363 involved aerial applicators and urban pest controllers, who already keep records.

However, the remaining 450 or so were reports of matters such as spray drift, health, safety and odour concerns, residue violations or complaints about baiting. In these situations, the presence of accurate records could have simplified investigations and assisted with the resolution of any problems that may have occurred.

The EPA considers that one of the main benefits of record-keeping requirements is that they allow quicker response to health or trade concerns about possible pesticide contamination. Proper medical diagnosis and treatment and the ability to assess contamination quickly can prove critical to avoiding harm to people or the environment or adverse impacts on trade. Proper record-keeping is also an essential component in effective enforcement of the Act to enable the EPA to ascertain what chemicals have been used and whether any breaches have occurred.

In the USA, the Maryland Department of Agriculture describes record-keeping as a wise practice for pesticide users, offering the following reasons (MDA 2000):

- Records can prove invaluable as a defence against a complaint or lawsuit that could arise at common law, under environment protection legislation or in relation to occupational health and safety.
- Records can help to determine which pesticide treatments work, which treatments do not work, and why.
- Records can help applicators to plan future purchases of pesticides so that only the actual amount needed will be purchased, keeping costs down and avoiding problems of disposal of unwanted pesticides and their containers.
- Records can assist with integrated pest management programs.
- If medical treatment for a pesticide injury is needed, pesticide record-keeping can provide information necessary to the medical staff.

The review team for the national competition policy review of agricultural and veterinary chemicals legislation in Australia reviewed the licensing requirements for commercial pesticide application in Queensland, Victoria, WA and Tasmania. The review team concluded that 'the requirement for detailed record-keeping by the business' was strongly associated with good practice.

Record-keeping is a requirement of quality assurance programs in agriculture, principally to protect Australia's agricultural export trade from existing or potential sanitary and

phytosanitary (plant health) barriers. Record-keeping serves useful purposes in this regard by assisting trace-backs where residues have been detected above maximum residue levels, and by providing assurance that withholding periods have been met. Quality assurance is being implemented in different ways among industries, with some processors paying a bonus for produce that is supplied in accordance with a quality assurance program, and others refusing to accept produce that has not been supplied under such a program.

Record-keeping can therefore benefit the person keeping the records. To the extent that it provides information that allows more efficient and effective pesticide use and more effective compliance with pesticides legislation, it can also provide external benefits for human health and the environment.

## **Issue summary**

Pesticide use record-keeping appears to have the potential to help resolve a number of actual or potential problems that could result from pesticide use. Recent reviews of government policy, along with requirements introduced into agricultural quality assurance programs, have generally supported this view.

However, discussions with industry and government sources suggest that record-keeping is low in some sectors, in particular the agricultural sector. It is estimated that 40% to 60% of agricultural premises keep some form of pesticide use records, but details kept by individual premises are highly variable and it is not clear whether records extend to all pesticide use or only where records are required by label (for example, endosulfan, parathion methyl).

It is therefore considered that there is a need to increase levels of pesticide use record-keeping in NSW.

## POLICY CONTEXT

This section describes the policy context within which the issue of pesticide use record-keeping lies in NSW.

### Recent policy history

In May 1997, the Environment Protection Authority released the discussion paper *Improving Pesticide Management in NSW*. The discussion paper set out principles for public comment and discussion of a number of factors influencing pesticide management in NSW.

The discussion paper outlined proposed changes to the *Pesticides Act 1978*, to:

- provide consistency with the national scheme for registering pesticides
- promote best practice approaches to pesticide management
- improve EPA enforcement tools
- allow key interest groups to contribute to the ongoing development of approaches to pesticide management through a statutory advisory committee.

The discussion paper was released for public comment from May until 31 August 1997. Three thousand copies were distributed and 124 written submissions were received. During July 1997 six public consultation meetings were held, in Dubbo, Griffith, Gunnedah, Lismore, Penrith and Yass, with a total of over 320 participants. Consultation sessions were held with specific stakeholder groups, including NSW Farmers, the Total Environment Centre and the National Association for Crop Protection and Animal Health (AVCARE).

The majority of submissions and comments from the consultation workshops were supportive of the principles set out in the discussion paper and the need to update the legislation. One of the key issues raised during the consultation was a need for compulsory record-keeping by pesticide users.

Following from the discussion paper, the Minister for the Environment requested that the NSW Parliament's Standing Committee on State Development carry out an inquiry into the use and management of pesticides in New South Wales. The Standing Committee's majority report (Parliament of NSW Legislative Council Standing Committee on State Development 1999) included recommendations that:

- the *Pesticides Act 1978* be amended to require all statutory, professional and commercial users of pesticides, including primary producers, to keep records
- these records should be available for inspection and/or copying by the NSW Environment Protection Authority
- the EPA should develop a sample form document for recording relevant information.

The Standing Committee noted that:

The record-keeping requirement would be consistent with a number of departmental and industry initiatives. Departmental initiatives include the voluntary requirements of WorkCover, *Codes of Practice for the Safe Use and Storage of Pesticides* and NSW Agriculture's advisory booklet on the principles of *Spray Drift Management*. Industry initiatives incorporating record-keeping include the wine industry's *Winecare* program, the agricultural industry *Cattlecare* and *Flockcare* programs. (p. 86.)

In 1999 in the development and passage of the *Pesticides Bill 1999*, it was decided that statutory record-keeping requirements, other than those already applying to aerial pesticide applicators, would be more appropriately left to detailed Regulations under the Act, which would allow for further detailed consultation. Regulations prescribing record-keeping were foreshadowed in the Minister's second reading speech on the new *Pesticides Act 1999*.

## The Pesticides Act 1999

The *Pesticides Act 1999* commenced on 1 July 2000, replacing the older *Pesticides Act 1978*. The objectives of the Act include:

- promotion of the protection of human health, the environment, property and trade in relation to the use of pesticides, having regard to the principles of ecologically sustainable development
- minimisation of risks to human health, the environment, property and trade.

The *Pesticides Act 1999*:

- promotes the proper use of pesticides
- promotes the protection of human health, the environment, property and trade by minimising risk and having regard to principles of ecologically sustainable development
- addresses concerns relating to potential adverse impacts of pesticide use on human health, property, trade and the environment
- removes duplication with National Registration Scheme
- strengthens and modernises pesticide regulation
- provides greater consistency with other environmental legislation
- provides for community involvement in development and implementation of reforms.

Section 54 of the Pesticides Act imposes specific record-keeping requirements on people carrying out aerial application of pesticides.

Other record-keeping requirements are not specified in the Act but may be prescribed by Regulation. In particular, section 119 of the Act provides specific power to make Regulations for:

- the making and keeping of records in relation to the use of pesticides
- requiring records to be kept, and information to be provided, in relation to the supply, distribution, use and disposal of pesticides
- the verification of regulatory requirements by statutory declaration.

## Other legislation

Other legislation that affects the use of pesticides, and record-keeping requirements associated with pesticide use, includes:

- Occupational Health and Safety (Hazardous Substances) Regulation 1996
- Occupational Health and Safety (Pest Control) Regulation 1988
- Rural Lands Protection Regulation 1995
- *Native Vegetation Conservation Act 1997*
- *Stock (Chemical Residues) Act 1975*
- Dangerous Goods legislation.

## **Existing record-keeping requirements and practices**

### **Users of chemicals with record-keeping as a label requirement**

It is a requirement of the National Registration Authority for Agricultural and Veterinary Chemicals (NRA) that users of endosulfan make and keep detailed records of endosulfan use. Additional requirements apply for the use of endosulfan by cotton growers and by aerial applicators.

While endosulfan is the main chemical affected by label requirements for record-keeping, other chemicals such as parathion methyl also have this type of label requirement.

### **Employers in workplaces using hazardous substances**

Employers in workplaces where employees use hazardous substances (which includes most pesticides) are required to maintain records of pesticides kept on site, certain risk assessments, training, health surveillance and monitoring under the Occupational Health and Safety (Hazardous Substances) Regulation 1996. They are not required to make records of pesticide applications. However, training of employees is a requirement of this Regulation, and training may include pesticide application record-keeping. The Regulation applies to self-employed people as well as employers, so it also covers agricultural workplaces without employees if non-employees are on the site.

The WorkCover *Code of Practice for the Safe Use of Pesticides including Herbicides in Non-Agricultural Workplaces* (WorkCover 1998a) and the *Code of Practice for the Safe Use and Storage of Chemicals (including Pesticides and Herbicides) in Agriculture* (WorkCover 1998b) specify record-keeping as a good practice in relation to pesticide use and recommend that it be included in training programs and carried out in the workplace. While not mandatory, the record-keeping practices contained within the codes of practice are likely to be adopted by some users to ensure compliance with Occupational Health and Safety legislation.

### **People operating as pest controllers or fumigators**

Commercial pest control operators and fumigators are required to be licensed by WorkCover under the Occupational Health and Safety (Pest Control) Regulation 1988. There is no requirement for licensees to keep records of use under their licences, except in relation to termiticide treatments, where a record must be provided to the occupier of the premises treated under Australian Standard AS3660. However, operators generally include records within invoices. There are currently 1624 pest control operators and 280 fumigators licensed in NSW.

### **Aerial applicators of pesticides**

As mentioned above, Section 54 of the Pesticides Act requires the holder of a licence to apply, or employ pilots to apply, pesticides by aircraft to keep various records on the use of aircraft to apply pesticides. There are 325 people currently licensed in NSW to apply pesticides aerially.

### **Primary producers**

About 50% of primary producers already keep some sort of pesticide use records. These can vary in content from the area treated, the chemical and the date applied, to the comprehensive requirements of the endosulfan spray record.

Record-keeping practices appears to vary significantly among different industries within the agricultural sector, although detailed information about individual industries is difficult to obtain.

Detailed record-keeping can be expected from primary producers involved with the various quality assurance programs operating across the agricultural sector. Agricultural industry

quality assurance programs such as Cattlecare, Flockcare, Winecare and SQF (Safe, Quality Food) 2000 require detailed record-keeping to enable appropriate auditing of accredited properties.

For export horticulture and viticulture, the present standard of record-keeping appears to be high. Many processors require food safety plans such as SQF 2000 and Hazard Analysis Critical Control Points (HACCPs) and, in respect of domestically-marketed foods, major supermarket chains require high standards from their suppliers. For example, suppliers of Woolworths Supermarkets must keep detailed records so that they can identify any pesticide treatments given to produce, right down to an individual paddock or field level.

As described above, users of endosulfan must now keep detailed records of endosulfan use. This applies particularly to the cotton industry, which is a major endosulfan user. It is likely that these requirements, and the high level of community and regulators' concern about endosulfan use, have resulted in a high level of record-keeping by cotton growers for applications of all types of pesticides.

The performance of other agricultural industries, and non-accredited members of industries with quality assurance programs, is more difficult to assess.

## OBJECTIVE OF THE AMENDMENT

The specific objective of the proposed amendment to the Regulation is to **maximise the net benefit achievable from pesticide use record-keeping**. This will help to:

1. reduce the human health and environmental impacts of the use of pesticides through more effective and timely responses to problems that arise

*This contribution can be made through records providing information in the event of cases of acute or chronic human chemical poisoning or environmental impacts from pesticide use.*

2. reduce the current risks or avoid future risks to agricultural trade

*This contribution can be made through records providing primary producers and exporters with more information about the likelihood of their produce exceeding maximum residue levels, and by providing for more efficient and effective trace-back mechanisms when maximum residue levels are approached or exceeded.*

3. increase the efficiency of pesticide use

*This contribution can be made through records providing information for comparison with integrated pest management guidelines and techniques, and also by providing for consideration of possible external costs when future pesticide use decisions are made.*

4. achieve the objectives of the Pesticides Act

*This contribution can be made through assisting users to improve their chemical use practices and allowing for better understanding of use practices and patterns, which will help to achieve the general health and environmental objectives<sup>3</sup> of the Pesticides Act. Record-keeping can also help with enforcement of provisions of the Act, for example by records providing evidence as to whether an offence has (or clearly has not) been committed against the Pesticides Act, thereby improving the efficiency of investigations into alleged breaches. More effective enforcement will have a deterrent effect, which will help achieve the objectives of the Pesticides Act.*

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<sup>3</sup> The objectives of the Pesticides Act are set out in the Policy Context section of this Regulatory Impact Statement.



## THE BASE CASE

The base case is the situation that would occur if no action were taken. In this case, the base case means that no additional Regulations, education or guidance material would be provided to require or encourage more record-keeping or better record-keeping practices.

As described earlier, people applying pesticides aerially, urban pest controllers and fumigators are required to keep records. In the absence of any new programs, it is expected that these requirements would remain unchanged.

However, it is expected that over five years there would be continued growth in the numbers of primary producers involved with quality assurance programs such as:

- Cattlecare and Flockcare
- Winecare
- Freshcare
- SQF ('Safe, Quality Food') 2000
- HACCP (Hazards Analysis Critical Control Point)
- Cotton BMP (Best Management Practices)
- ISO 9000
- NIASA (Nursery Industry Accreditation Scheme, Australia).

For example, in NSW the Cattlecare program has grown to around 1500 fully accredited participants. However, the rate at which new businesses join the program has increased significantly in the last year after a relatively slow start and it is likely that numbers will double within 12 months. Cattlecare estimates that about 5000 businesses in NSW have information about the program and are working towards fulfilling the accreditation requirements. This suggests that there will be a significant increase in the levels of voluntary record-keeping.

Growth in quality assurance program membership is expected because of increased focus on food quality and agricultural trade standards (for example, maximum residue levels) by Australia's export markets, and because of increased purchaser pressure in the domestic market (for example, the requirements set by Woolworths as a purchaser).

It is also expected that the current requirements for endosulfan record-keeping (and other chemicals where record-keeping is a label requirement) will remain in place.

Discussions with industry and government sources suggest that some level of record-keeping is currently carried out by 40% to 60% of primary producers, although in many cases this represents only very basic information. The percentage becomes progressively lower as the level of detail of the records increases. (For example, it is likely that relatively few businesses would voluntarily keep records at the level of detail of the endosulfan spray sheet.)

In respect of industries other than primary producers, such as commercial pesticide applicators, sports clubs, and local government and State Government departments, the existing level of record-keeping is believed to be higher owing to the higher proportion of bodies with employees, and therefore more stringent occupational health and safety requirements.

This analysis assumes that record-keeping at the level identified in the proposed Regulation is presently carried out for about 30% of pesticide applications. This figure is expected to increase under the base case owing to growth in voluntary quality assurance programs.

## PROPOSED RECORD-KEEPING DETAILS

The proposed objective identifies four broad areas where record-keeping could improve the current situation or avoid future problems, as set out in the issue description. To achieve the objective, consideration must be given to the level of record-keeping that is appropriate and/or necessary to each area. If this is not done, then 'record-keeping' will be interpreted differently from person to person, the consistency of records will be poor, and records may prove to be inadequate for different types of inquiry.

Consideration of written submissions received from the Pesticide Implementation Committee (PIC) members, the Environment Protection Authority's discussion paper *Improving Pesticide Management in NSW* in 1997 and the Parliament of NSW Legislative Council Standing Committee on State Development report *The Use and Management of Pesticides in New South Wales* in September 1999, indicated a broad consensus on many aspects of record-keeping.

In particular, there was a desire that the record-keeping should be useful and that it should not be overly onerous. For example, widespread application of the record-keeping requirements that apply to endosulfan use was considered to be excessive for most chemicals. It was also noted that there would be practical difficulties in applying a single record-keeping model to all pesticide users or use.

In general terms, if pesticide record-keeping is to be promoted, the following matters must be decided upon:

- Which people should make and keep records?
- What information should be recorded?
- When should records be made?
- For how long should records be kept?
- In what form should records be kept?

These matters are discussed in the following sections, along with a brief comment on the significance of each matter.

### Who should keep records?

The broad view from consultation and reviews to date is that pesticide use records should be kept by all people who use pesticides for commercial purposes, including primary producers.

'Commercial purposes' clearly includes everyone who uses pesticides with the intention of making a financial gain, either where pesticide application is the principal business activity or because pesticides are an important business input.

This group includes pest controllers, fumigators, greenkeepers, commercial pesticide applicators (aerial or ground-rig operators) and primary producers who use pesticides as part of their commercial operations.

However, setting the requirements for record-keeping in this way would still leave out a number of groups who carry out pesticide applications that could affect the achievement of the objective of the amendment. Setting the requirements this way could also include commercial situations where pesticide use presents a very low risk, for example where it is only incidental to the main business or trivial in nature.

Given the objective sought, records should also be kept by:

- public authorities using pesticides, such as the National Parks and Wildlife Service, Department of Land and Water Conservation, the NSW Forestry Commission (State Forests), and the Roads and Traffic Authority
- local authorities such as city and shire councils and the 12 noxious weed county councils in operation.

In contrast, there is likely to be a very low risk of failure to achieve the objective when people who use pesticides for commercial purposes use them in an essentially 'domestic' way (for example, spraying flies in the office). There is also likely to be a low risk when people carry out pesticide applications that are small in scale or localised in their area of effect and so are unlikely to pose a serious risk to people's health or to produce or ecosystems, on-site or off-site.

In these situations, there is likely to be little to gain from record-keeping.

In order to achieve the objective, record-keeping would be usefully carried out by:

- all commercial pesticide applicators
- primary producers
- public authorities and local authorities.

In some businesses, pesticides may be applied by employees. The essential requirement in the proposed Regulation is that an employer should ensure a system is in place so that records are made and then kept by the employer.

The proposed record-keeping requirements are limited to cover those practices where there is a greater risk of harm to neighbours, their property or the environment, or a risk of harm to trade through residue violations. For example, the proposal does not require record-keeping for lower risk usage such as hand-held equipment in agriculture, except in horticulture where such equipment has a greater potential to lead to residue violations or, because of proximity to neighbours, to lead to off-farm impacts.

The extent of coverage of the record-keeping requirements is likely to be significant to both the costs of the policy and the benefits. With respect to benefits, it is likely that the ability to obtain significant public benefits will require records to be kept for a broad range of situations.

## **What details should be recorded?**

Existing records kept by people using pesticides for commercial purposes range from relatively simple records (for example, name, date, pesticide type and area treated) through to detailed requirements such as those currently required for endosulfan. There is effectively a continuum of record-keeping possibilities, but the important thing is that records are made at a level of detail that is commensurate with the potential impact of the activity. This was partly addressed above, in the discussion of who needs to keep records and in what circumstances records need to be made.

At a minimum, for a pesticide application record to be of practical use, the following information should be recorded:

- full product name of the pesticide applied
- rate of application and quantity applied
- time and date when the pesticide was applied
- location and area where the pesticide was applied, for example, paddock or field numbers
- name, address and contact details of the person who applied the pesticide.

This information allows a person looking back over the record to answer the basic 'what, when, where, how much and who' questions that relate to pesticide use. While less information than this could be recorded, it would simply lead to a need to answer the other questions for which information was not recorded.

The EPA's experience with pesticides, particularly dealing with spray drift, odour problems and label offences, suggests that the following information would also be usefully recorded:

- target pest or pests
- description of the equipment used to apply the pesticides
- description of the way the pesticide was applied
- description of the area treated
- weather conditions before and during application, including wind speed and direction and temperature.

The proposal for target pest or pests to be recorded recognises that not all chemicals are registered for use against all pests.

Recording the equipment used and the way the pesticide was applied can provide useful information as to whether a particular pesticide application could have caused a problem. For example, some methods may be more conducive than others to spray drift, depending on the circumstances.

The description of the area treated (for example, bare soil, emergent crop, house basement) allows an assessment of the possibility of off-site effects occurring. In agricultural uses, it also provides useful agronomic information about such things as changes in the patterns or times when pests become a problem.

Records of the weather are particularly important for demonstrating due diligence, that is, for indicating that pesticides were used at times when off-site effects were unlikely to occur as a result of pesticide use.

These records are broadly consistent with those recommended in WorkCover's Codes of Practice and with current requirements of licensed applicators of pesticides in NSW, Victoria, Queensland and overseas (for example, in some States of the USA).

The majority of the items of information identified above are existing requirements for people licensed to make aerial pesticide applications in NSW, with the exception of the target pest and the rate and quantity applied.

Discussions with industry suggest that making a record using the proposed fields would take about 10 minutes. The cost of the policy is, to some extent, insensitive to the level of detail to be recorded once the decision to make a record is made.

We have prepared a record-keeping sample form for guidance as to the type of information that should be recorded. This is included in Appendix 2. To ensure the Regulation is workable, efforts will be made to ensure that the sample form is as user friendly as possible.

## **How soon after pesticide use should records be made?**

Records should be made reasonably soon after a pesticide is used, to ensure that the record-keeping is accurate and in case any immediate problems arise following pesticide application.

Making records at the time of application is likely to be difficult in many cases. While this means that records are immediately available, the opportunity cost of this time is high and an 'instant record' is unlikely to provide any benefit over a record made later that day or the next day.

However, leaving record-making until many days after pesticide application means that the accuracy of records is likely to decline and also that records may not be on hand if short-term problems arise out of the pesticide application.

It is preferable that records be made as soon as is reasonably practical after a pesticide has been used—the same day if possible. The costs of the policy are insensitive to this matter, but the benefits may be greater or lesser depending on the length of delay incurred.

### **For how long should records be kept?**

The length of time for which records should be kept needs to be a reasonable balance between the likelihood that a record is still useful after any given period of time, and the cost of continuing to hold it.

The Pesticides Act requires that people applying pesticides aerially in NSW keep their records for three years after the pesticide has been applied. Licensed applicators of pesticides in Victoria and Queensland, and all users of endosulfan in Australia, are required to maintain pesticide use records for two years. For comparison, under the *Protection of the Environment Operations Act 1997*, licensed generators and transporters of hazardous wastes, and facilities involved with transport of hazardous wastes, are required to keep records for three years. The NSW WorkCover Authority recommends that records of pesticide applications be kept for five years. (WorkCover 1998b, s. 13.4.)

The length of time for which records should be held (or must be held) differs depending on the jurisdiction and the purpose for which the records must be kept. Given existing requirements in NSW for similar records, the proposed Regulation states that records be maintained in some form for at least three years. The records could be kept in an electronic or written form, or integrated with other similar records (whichever is most convenient for the business), provided that the records are retrievable (and legible) if needed.

The cost of the policy is relatively insensitive to this item, while the benefits are more sensitive.

## **ALTERNATIVES AVAILABLE FOR ACHIEVING THE OBJECTIVE**

This section describes two alternatives that may be used to achieve the proposed objective. Option 1 (do nothing—i.e. the base case) is an approach principally based around voluntary record-keeping, while Option 2 (the proposed Regulation) would make record-keeping mandatory.

### **1. Do nothing**

The 'do nothing' option does not mean that no change would occur, but means that no additional action would be taken beyond the current licensing requirements for some groups of commercial pesticide users; the education and guidance provided by industry, NSW Agriculture and WorkCover via its codes of practice; and the requirements of industry quality assurance programs arising from market pressure.

As such, if the 'do nothing' option were taken then the base case would occur as described previously. Under the base case, the level of pesticide record-keeping would gradually increase over five years from its current base of about 30%, principally because of growth in industry quality assurance programs. The principal risks associated with human health impacts and environmental and trade impacts would decrease over that time. For the purpose of this analysis, it is assumed that the risks would decrease in a linear relationship with the increase in record-keeping.

### **2. Proposed Regulation**

The proposed Regulation would require pesticide users to make records of the matters identified in the previous section. Specifically, these matters are:

- the full product name of the pesticide applied
- the pest or pests targeted in the application of the pesticide
- the rate of application of the pesticide and the quantity applied
- a description of the equipment used to apply the pesticide
- a description of the manner in which the pesticide was applied
- a general description of the area treated or affected by the pesticide
- the specific location and address where the pesticide was applied
- the date and times of the application of the pesticide (including the start and finish times)
- the name, address and contact details of the person who used the pesticide or (if that person was employed to apply the pesticide) that person's employer
- the name, address and contact details of the owner or occupier of the land in respect of which the pesticide was applied (if different from above)
- if the pesticide is applied outdoors by means of any spray equipment, a description of the weather conditions (including wind speed and direction, and temperature) immediately before and during the application of the pesticide.

It is likely that compliance with the proposed Regulation would be promoted through a mix of information and education about requirements, and would be enforced during incident responses and through routine inspections and industry compliance audits carried out by the EPA.

The proposed Regulation would provide for additional details to be recorded by licensed aerial applicators under s. 54(2)(g) of the Act, namely:

- the pest targeted in the application of the pesticide
- the rate of application of the pesticide and the quantity applied.

The proposed Regulation defines those other persons who are required to make and keep records of pesticide use as those who use the pesticide:

- (a) in the course of carrying on a business involving the use of pesticides, or
- (b) while acting in the capacity as landlord of the premises on which the pesticide is used, or
- (c) while carrying out pest control operations for or on behalf of a public authority, or
- (d) while carrying out pest control operations on a golf course or bowling green.

(Pesticides Amendment (Records) Regulation 2000 – Clause 11B)

However, records would not be required for uses where there was no significant risk in terms of the objectives of the proposed Regulation. Accordingly, a number of exemptions are proposed in two of the general areas described.

1. In the case of pesticide use in the course of a business (other than agricultural, forestry or farming operations), a record would not be required for use of a pesticide (other than a fumigant) that was:
  - ordinarily used for home gardening or other domestic purposes
  - available to the general public through a retail outlet, and
  - had been obtained in a package or container no larger than that usually available to the general public at such an outlet.
2. In the case of pesticides used in connection with agriculture, forestry or farming operations, a record is required to be made only when:
  - livestock are treated for ectoparasites by means of a dip bath or by the use of powered spray equipment that is not hand-held
  - harvested horticultural crops are treated by means of a dip bath
  - spray equipment of any type is used to spray horticultural crops
  - powered spray equipment is used to spray crops (other than horticultural crops), or trees in a plantation
  - ground-driven powered spray equipment<sup>4</sup> that is not hand-held is used
  - baits are applied to control vertebrate pests (other than baits that are used to control rodents in or around buildings).

The proposed Regulation also includes provisions for:

- the owner or occupier of land used for agricultural, forestry or farming operations to be provided with a copy of the pesticide use record if the application of pesticides on that land is carried out by someone else
- the EPA to exempt a person or class of persons from record-keeping requirements by notice in the gazette, following consultation with the Pesticides Implementation Committee and other relevant people as the EPA thinks appropriate
- the integration of records made under the proposed Regulation with records required under any other law

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<sup>4</sup> The proposed Regulation defines ground-driven powered spray equipment as powered spray equipment that is mounted on or attached to a vehicle, with the spray equipment powered otherwise than by human energy.

- offences and enforcement options, including penalty notice offences for failing to make, keep or provide copies of records, and for including false or misleading information in a record.

The expected outcome of the proposed Regulation is that, in comparison to the base case, it would rapidly raise the level of record-keeping to near 100% by the end of five years. This high level of compliance assumes that pesticide users understand the reasons for the record-keeping requirements, the reasons for making record-keeping mandatory and the fact that record-keeping costs are not excessive per individual record (or per business when the aggregate number of pesticide applications per season or year is considered).



## **IMPACT ANALYSIS**

This section sets out the impacts, costs and benefits of the proposed Regulation with reference to the base case or 'do nothing' option.

### **Impacts**

The proposed Regulation will mean that between 40% and 60% of agricultural, farming and forestry pesticide users will have to keep records of pesticide use for the first time. The remaining parties (particularly urban pest controllers and fumigators), who already keep records, may have to include additional details with the records that they make.

Appendix 1 indicates the number of eligible pesticide applications likely to be made in any year by the affected groups. From Appendix 1, it can be seen that the estimated range is approximately 250,000 to 500,000 applications a year, excluding applications by groups for whom record-keeping is already a legal requirement, and groups whose applications are counted in other categories. This estimate is subject to significant uncertainty, as described further below.

It can also be seen that there are about 380,000 applications made by urban pest controllers and fumigators. These groups generally keep records of most of the details set out in the proposed Regulation, but may have to include further details relating to the equipment used and manner of pesticide application, times of application, and weather details if application is external.

The EPA will be required to provide education and guidance about the new Regulation, and is likely to include a record-keeping component in future audits and routine investigations.

### **Costs**

The cost of the proposed Regulation depends principally on how many pesticide applications are made by the groups covered by the proposal, and the unit cost of making records. There will also be some costs of educating pesticide users about the new Regulation and carrying out enforcement.

#### **Costs to industry**

The principal cost to industry is the opportunity cost of the time that will have to be devoted to record-keeping under the proposed Regulation. There may also be other minor costs, such as stationery, altering existing record-keeping systems, and physical file space or computer file space for keeping the records.

The opportunity cost of time for record-keeping is determined by the number of records that need to be made per year, the unit time required, and the value attributed to that time. These are considered in detail in Appendix 1.

The upper end-point of the range of pesticide record numbers will be used to calculate cost impacts. The purpose of this is to avoid underestimating the costs and to address one of the areas of uncertainty (described further below).

It is estimated that completing a full record will take around 10 minutes on average, at a cost of \$4.15 per record. It is estimated that, if no records were currently kept, about 500,000 new records would need to be made each year in sectors other than urban pest control and fumigation.

However, some users already keep records (this is estimated at 40% to 60%, either voluntarily or under other statutory requirements); this will reduce compliance costs to some extent.

The cost to industry of the record-keeping requirements is therefore the sum of:

- (a) the cost to people who currently keep no records (this cost being the number of totally new records, multiplied by the full cost of making a new record, that is \$4.15), and
- (b) the additional cost to people who already keep some records, of recording additional details on each record (this cost being the number of partial to full records made, multiplied by the cost of recording the additional details needed to meet the proposed requirements).

For the purpose of this analysis, it is assumed that 50% of records (other than those made by urban pest controllers and fumigators) will be totally new records, at an annual cost of \$1.04 million.

The remaining 50% of records are already made by industry, but generally with less detail than that recommended in the proposed requirements. For this analysis, it is assumed that the additional cost of upgrading these records to meet the proposed requirements is equal to 40% of the cost of making a new record. The annual cost is therefore \$0.4 million.

The total cost estimate of record-keeping other than by urban pest controllers and fumigators is therefore \$1.45 million. Over a five-year period, the present value of this is \$5.96 million.

In addition, it is anticipated that the extra requirements for urban pest controllers and fumigators will increase the time taken for those groups to make records by approximately 10%. Using the costs above and 380,000 records a year, the estimated additional cost to this group is about \$150,000 a year. Over a five-year period, the present value of this is \$620,000.

### **Costs to government**

Implementation costs fall into two parts: those associated with the initial phase of regulatory implementation, and those associated with ongoing activities.

The initial phase involves preparation of education and guidance material to help the public understand the requirements of the proposed Regulation and the reasons why record-keeping will be compulsory. The education and guidance material must then be communicated to people likely to be affected by the proposed Regulation. It is estimated that development of guidance material will cost about \$7,900. Publication and printing of the guidance material is estimated at \$10,000. Media activity, advertising and mailouts of the guidance material are estimated to cost an additional \$8,700. The total initial cost, which will be incurred in the first year, is approximately \$27,000.

The ongoing phase will involve industry audits and routine investigation work. While the frequency and timing of audits varies according to the need for them and the practicality of carrying them out, it is expected that there will be three major audits of different industry sub-sectors within the first five years of the Regulation, most likely occurring in years 2, 3 and 4. It is estimated that each audit will take 14 weeks of staff-time per year from commencement to completion of final reports. The estimated cost of an audit each year is approximately \$24,000.

Because initial costs, investigations and audits occur in different years, their costs can only be compared by changing them into present-day values. This is done by discounting future costs by 7% for each year into the future that they occur. With discounting, the present value of implementation costs over five years is \$83,600. In annualised terms, this is \$20,400 a year.

### **Total cost**

The total cost in present value terms over five years is therefore about **\$6.6 million**, or **\$1.6 million** a year in annualised terms.

## **Benefits**

The benefits of the proposed Regulation fall into categories of private and public benefits. Private benefit is the benefit solely to the person carrying out the record-keeping, while public benefits are benefits external to the person carrying out the record-keeping.

### **Reduced risk of trade impacts**

As described earlier, agricultural sector quality assurance programs have as their primary objective the avoidance of restrictions on Australian agricultural exports on sanitary or phytosanitary grounds. Detailed record-keeping is a requirement of industry quality assurance programs to enable auditors to ensure that accredited members are complying with pesticide use programs and thereby avoiding any increase in the risk of trade restrictions.

Compulsory record-keeping as established by the proposed Regulation will not include the quality assurance audit component for all pesticide users, as would be the case in an industry quality assurance program.

However, the existence of records will provide useful information to primary producers themselves about their compliance with withholding periods. It is possible that this information could also be indirectly useful to processors and export companies in requiring producers to certify that their produce is residue-free, although those organisations will not have the authority to inspect records or require records to be presented.

These factors should reduce the risk of violations of maximum residue levels and thereby reduce the likelihood of impacts on export trade or impacts on the welfare of domestic consumers if contaminated produce slips through domestic screening programs. The value of this cannot yet be quantified.

Also, the Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) indicated in the national strategy for agricultural chemicals that the development of pesticide risk indicators would help pesticide users, suppliers and regulators to make better judgements concerning the use of such chemicals and the risks imposed by such use.

The Organisation for Economic Cooperation and Development has initiated a major program to develop such indicators, which require comprehensive data of the type that would be provided by the proposed record-keeping requirements. (ARMCANZ 1998, pp, 14–15). The council also states that no country yet has the data required. The issue of collection of use data is being considered nationally by Australian agricultural agencies. This proposed Regulation would ensure that records were held by individual users. If in the future a mechanism were developed for aggregation of individual records, this Regulation would provide a data set that would enable Australia to have significant input to the development of such indicators. This would be likely to benefit NSW.

### **Reduced risk of lowered agricultural production value**

The value of agricultural production can be lowered in two ways through pesticide use. The first is where a residue violation occurs. If record-keeping can provide information that ensures that agricultural produce is not rejected at the processing or storage site, this provides a benefit to the individual business of avoiding the cost of having that produce condemned.

The second is where problems occur with diseases or blemishes on crops. These problems may be caused by over- or under-use of pesticides. NSW Agriculture advises that its staff are often called on to determine why crops are damaged. Record-keeping can help with this by allowing businesses to identify whether the pesticide application has caused the problem, or whether a biological agent is responsible and pesticide use has been ineffective. The values of these benefits cannot yet be quantified.

### **More effective investigations into pesticide incidents**

As described earlier, EPA pesticides inspectors investigated 917 pesticides incidents between 1996 and 1999, of which about 450 (or 110 a year) would have been affected by the proposed Regulation had it been in force (that is, they did not involve aerial pesticide applicators, pest controllers, domestic users or wilful damage).

Of those, 59 (or 15 a year) were residue violations detected through the National Residue Survey or the Sydney Market Authority survey. It is estimated that such violations require at least 1 to 3 days of EPA staff time to investigate the handling line and prepare a report, with National Residue Survey trace-backs requiring more time than Sydney Market trace-backs. It is likely that record-keeping can reduce the time taken on trace-backs and reduce the number of residue violations that occur. At an estimated time cost of \$340 a day, a reduction of between half and one day in time requirements would save \$170 to \$340 on each investigation. This cannot be extended across all 15 residue violations per year, as it is expected that this number will fall as described above.

However, extending these benefits to all 110 significant investigations per year, and assuming the midpoint of \$255 per investigation, suggests that the total benefit in this category would be about **\$28,000** a year. The real benefit should be slightly lower than this, as residue violations are likely to decrease. This assumes, however, that evidence of more effective enforcement does not induce additional complaints.

### **Reduced incidence of environmental or health effects from pesticide use**

One of the major concerns regarding pesticide use is its potential for adverse impacts on human health and the environment.

Pesticides have been linked with a number of medical conditions. Relatively minor conditions include headaches, dizziness, nausea, rashes and itching. More seriously, pesticides have also caused burns, gastrointestinal, respiratory and neurological problems, skin diseases, blindness and death from acute poisoning. It is also possible that pesticide exposure may be linked to conditions such as reproductive disorders and cancers.

A number of different databases provide evidence of human health impacts from pesticides, usually as a result of direct handling leading to burns, poisoning or skin diseases. Workers' Compensation data for NSW shows that about 20 compensation claims for pesticide injuries are made each year. These data and other data sets (such as inpatients' statistics) are likely to significantly under-represent health impacts from pesticides. This is likely to occur because, for example, not all people affected by pesticides are covered by Workers' Compensation arrangements, and not all people affected by pesticides necessarily present at public hospitals.

One of the most significant recent cases of pesticide poisoning in NSW occurred when three shearers were affected by organophosphates that had been used to treat the sheep they were shearing. Each shearer suffered symptoms such as headaches, rashes, itching, stomach symptoms and, for two of the shearers, diarrhoea. Legal action from the incident resulted in the shearers' former employer paying nearly \$700,000 in compensation. (Winder and Garg 1999.)

There is less information available on the health impacts of broader environmental (rather than occupational) exposure to pesticides. However, health surveys undertaken at Gunnedah in 1996 in response to community concern about pesticide use led to the conclusion that a number of health problems appeared to have been triggered or aggravated in susceptible people by exposure to pesticides and/or their odour. Symptoms of rhinitis, asthma and headaches were assessed as having a probable or uncertain relationship to cotton pesticides in Gunnedah. (Fragar et al. 1996.)

Pesticides can have adverse effects on the environment beyond those intended in the control of target pests. There is little systematic collection of findings of investigations or reports into

pesticide impacts on the environment, but the following examples illustrate the type of environmental harm that can occur and indicate the potential for both acute and chronic ecological impacts.

Studies of irrigation drainage water from the Murrumbidgee Irrigation Area in 1993–94 showed that a mix of pesticides was present in the drainage water. Laboratory tests of drainage water samples involving water flea species, which form a basic part of the aquatic food chain, showed that the contaminated water had chronic toxicity to the water fleas. (Korth et al. 1994.)

Increasingly frequent incidents of large fish kills in the northern cotton growing areas have been attributed to high levels of pesticide use, particularly of endosulfan (Napier et al. 1998). Population densities of the six dominant macroinvertebrate taxa in the Namoi River in 1995–96 and 1997–98 cotton growing seasons were negatively correlated with total endosulfan concentrations in the river (Leonard et al. 2000). The concentrations of endosulfan that affect some of these macroinvertebrates in laboratory studies (Leonard et al. 1999), were lower than the endosulfan concentrations measured in the river during storm events (Muschal 1998).

Profenofos, an organophosphorous compound (OP) widely used in the cotton-growing areas of NSW, has also been implicated in fish kills (Kumar and Chapman 1998). Profenofos also affected enzyme activity associated with nerve transmission in the native shrimp *Paratya australiensis* (Abdullah et al. 1994).

Chlorpyrifos has been associated with a number of fish kills in Australia, mostly to do with its use in termite protection rather than in agriculture. It has also been associated with bird kills, usually caused by birds eating contaminated invertebrates. In particular, chlorpyrifos may have caused the deaths of large numbers of ibis nestlings in the Macquarie Marshes in 1995, after parent birds brought contaminated invertebrates back to the nests as food. (NRA 2000.)

Endosulfan, for which there are already record-keeping requirements, provides an example of the type of environmental harm possible from pesticides. In 1998, the NRA wrote that acute impacts on fish were likely during the spray season, subtle chronic effects on aquatic fauna were possible given the frequency with which environmental guidelines for endosulfan were breached, and endosulfan residues in soil appeared to exert protracted adverse effects on earthworm populations. (NRA 1998.) Record-keeping requirements were one of a number of changes that followed the NRA's review.

The record-keeping requirements under the proposed Regulation would help to reduce or avoid potential health and environmental impacts of pesticides, by reminding pesticide users to check their use patterns and check label requirements such as registered uses and application rates. While the records would be made after a pesticide application, they may serve to improve performance at the time of the following pesticide application. In many cases this reminder of good practice would improve pesticide application performance independently of any deterrent effect from enforcement.

Record-keeping would also allow an increase in the effectiveness of investigations, which would be likely to result in more effective enforcement of the Act. Once record-keeping was undertaken at a high level, investigation and enforcement activity would be focused on compliance with the provisions of the Act rather than the record-keeping Regulation, and records would allow:

- people who had not been involved in any pesticide problems to demonstrate this through their pesticide use records
- people who had been involved with a pesticide problem to demonstrate **due diligence** in their pesticide use, where a possible offence against sections 10 and 11 of the Pesticides Act (relating to injury to people, damage to property or harm to plants or animals) had occurred

- people who had been involved with a pesticide offence (either wilful or negligent) to be more rapidly identified.

This would minimise stress, inconvenience and cost to people who had used pesticides correctly or were in the vicinity but had not been involved in any potential pesticides offences, and would result in more effective achievement of the human health and environment protection objectives of the Act itself.

### **More efficient pesticide use and expenditures from improved understanding of pesticide use patterns and trends**

Records can help individual businesses to identify changes in pesticide use patterns over time and/or help with the implementation of integrated pest management strategies.

This potential benefit arises from pesticide users being able to determine more accurately the amounts of pesticide they need to use for particular pests, thus avoiding over- or under-purchase. Users can also identify whether similar pest problems are requiring progressively greater amounts of pesticide or more frequent pesticide applications over time. This helps to determine pesticide effectiveness, thereby enabling changes to control programs as necessary to manage pest species more effectively and, in agricultural situations, reduce the risk of future yield loss.

The potential benefit of this could be significant, since, as previously noted, expenditure on pesticides has in the past exceeded \$1.26 billion a year in Australia, of which between \$340 million and \$440 million could be attributed to NSW. Some of this cost is attributable to industries where records are already kept, for example urban pest controllers, fumigators, councils and applicators of pesticides by aircraft. If 70% of this cost can be attributed to agricultural uses, then record-keeping that allowed identification of a 1% saving in pesticide expenditure (for the 40% to 60% of agricultural businesses that do not currently keep any records of pesticide use) could provide a direct benefit of **\$1.0 million** to **\$1.9 million** a year.

### **Reduced costs and increased effectiveness of scientific studies**

The records would provide a potential benefit by reducing the future costs of any research into the impacts of pesticide exposure on human health or pesticide impacts on the environment. At present it is very difficult to obtain information on pesticide use practices or on the quantities of pesticides being used.

The existence of records held by individual pesticide users could significantly reduce the costs, and improve the effectiveness, of conducting surveys to determine pesticide use patterns and quantities by reducing the direct costs and the time taken, because the records would be in place rather than needing to be arranged and made over a period of time.

It may also be possible for more effective studies to be made by industry or research organisations of the use of pesticides against target pests under field conditions. This would require the agreement of the record holder, as it would not be compulsory for holders to make records available to any organisation or person other than the EPA.

The ARMCANZ national strategy for managing agricultural and veterinary chemicals includes a strategic action of supporting research to establish, for Australian conditions, scientifically justified maximum residue limits for key chemical-commodity combinations, particularly those significant in trade but poorly supported by existing scientific studies and data. (ARMCANZ 1998, p. 31). This type of research is likely to be made more cost-effective by the proposed requirements.

## Uncertainties

There are uncertainties in the following areas of the impact analysis:

- number of pesticide use records to be made each year
- level of record-keeping currently carried out
- cost to make an individual record
- extent to which record-keeping allows pesticide use savings
- approach of pesticide users to keeping records.

### **Expected numbers of pesticide use records in the agricultural, farming, forestry and public sectors**

There are unquantifiable factors that act to both increase and decrease the end-points of the estimated range of pesticide applications (250,000 to 500,000) per year in the agricultural, forestry, farming and public sectors.

Factors that act to increase the end-points of the range are:

- Agricultural pesticide uses are given as annual numbers of treatments of the whole crop, herd or flock (Appendix 1), but while the whole enterprise may be treated 'once', this may require a number of separate pesticide applications.
- Agricultural categories are based on the principal activity on a farm. However, in many cases there are minor enterprises, as well as the main enterprise, that may require pesticide use. The statistics provide for this through a 'mixed farming' category, and an exemption is proposed for minor uses, but there may still be an underestimate.
- Local authority pesticide uses are given as days per year when pesticides are used, but each authority may make multiple pesticide applications in a single day.

Other factors act to decrease the end-points of the range. One is that records would not be required for external pesticide treatments for livestock by people using hand-held equipment. This may reduce the numbers of records that are expected to be made by livestock enterprises, although in many cases pesticides are applied to buildings or pasture rather than animals.

Another is that records are not proposed to be required when hand-powered equipment is used to apply pesticides to non-horticultural crops, or when hand-held equipment is used to apply pesticides to pastures.

A conservative approach to estimating the number of records that would be made has been taken by using the upper end of the estimated range, which maximises the estimated costs of the proposed Regulation. The principal risk is considered to lie in underestimation of the number of pesticide applications made each year. If the number of these applications (those for which new records are required under the proposed Regulation) were underestimated by 50% (that is, a true level of one million a year), the annual cost of the proposed Regulation would increase to \$3.1 million, all other things being equal.

### **Current level of record-keeping**

The level of record-keeping currently carried out has been estimated through discussions with industry sources and NSW Agriculture staff familiar with the industries affected. Unpublished survey data have also been used. These indicate that the current level of record-keeping of pesticide use is between 40% and 60%. These estimates are considered robust. What is less certain is the percentage of record-keeping that meets the requirements of the proposed Regulation. This has been estimated at 30%, based on such things as endosulfan use, aerial application numbers and uptake of industry quality assurance programs. If the true percentage

were 15%, the annualised cost of the proposed Regulation would rise by \$300,000 to \$1.9 million a year.

### **Time taken to make a pesticide use record**

The time to make a pesticide use record has been estimated from discussions with industry sources, including those in the aerial application industry, where most of the proposed requirements are already required to be recorded. The record-keeping requirements are relatively simple, and 10 minutes is considered a reasonable amount of time to allow. It should also be noted that if records are already taken and kept, the marginal cost of modifying records to include additional details will be small.

The expected range for the average time taken is from five to 15 minutes, with five considered reasonably likely and 15 unlikely. Using this range of times, the potential cost range if all other factors were held constant would be \$817,000 to \$2.4 million a year. This cost may be reduced by the use of a sample form, one example of which is attached as Appendix 2.

### **Opportunity cost of time**

The cost of making a record was calculated using averages for Australia, as described in Appendix 1. Pesticide use is carried out across a number of sectors that may have quite different opportunity costs of time. Record-keeping may be substituted for leisure or for alternative work activities. It is difficult to value leisure time, and the value of alternative work activities varies across the different industries that use pesticides. For simplicity, the figure used (\$25 an hour) is the average hourly earnings rate across Australia, adjusted for overhead costs, although this figure relates to people receiving a wage rather than the self-employed. This figure is likely to give a reasonable estimate for the overall impact, although it is unlikely to be useful for individual industries or enterprises.

### **Pesticide expenditure savings and other benefits**

The extent to which pesticide expenditure savings can be made depends on how pesticide users make use of their records, and to what extent the particular industry is suited to reductions in pesticide use. For example, integrated pest management programs are aimed towards plant protection, with greater benefit in their use on higher-valued enterprises such as horticulture. Many horticulturists already use integrated pest management (and therefore keep records), reducing the potential for further pesticide use savings. However, the cost-offset levels identified are very small, at about 1% to 2%. Savings in pesticide use under integrated pest management programs are usually larger than this. Savings of the order of 1% to 2% are considered plausible.

Note that this and the majority of the other benefits of the proposed Regulation are based on the assumption that people who were required to prepare pesticide use records would then make use of those records for their own private benefit. If, instead, record-keeping were seen simply as another piece of regulatory red-tape to be complied with and then the records put away and forgotten, the benefits would be reduced.

In that situation, the principal benefits would be more cost-effective use of EPA resources during investigations and audits, potentially more effective scientific research, and the broader benefits of improved compliance with the Pesticides Act through the EPA's ability to carry out more effective enforcement.

## **Assessment**

The 'do nothing' approach does not mean that there would be no change to behaviour, but that the existing approach of industry quality assurance programs, preparation of educational material, commercial pesticide applicator licensing and WorkCover Codes of Practice would



continue. The 'do nothing' approach is therefore largely a mix of education and market pressure directed towards increasing and improving record-keeping practices on a voluntary basis.

Education about accurate record-keeping as both a good business practice and to allow more effective remedies to adverse off-site effects is important, and is likely to bring about improvements in record-keeping over time. Similarly, after a slow start, it appears that there is now a groundswell of support for various industry quality assurance programs that require detailed record-keeping for compliance audit purposes. This is likely to be occurring because of private benefits that provide their own justification for record-keeping, but gaining external public benefits will depend on the near-universal adoption of record-keeping practices.

As such, taking no action is still likely to lead to a significant improvement in record-keeping and a consequent reduction in risks over the five-year period for which this analysis is conducted.

However, there would continue to be businesses that did not maintain good records, or any records at all in some cases. This would be a decision taken by the business operator that the costs of keeping records outweighed whatever private benefits the business might gain from record-keeping. This decision could be based on a number of factors, such as an assessment of cost relative to business turnover, personal preference to maintain current approaches, belief that education material encouraging record-keeping is an unwarranted intrusion, doubt about the suggested benefits, concern about what the records might show if examined, or simply lack of understanding.

These businesses would therefore not obtain the private benefits of record-keeping in relation to pesticide use. However, in the event of a pesticide use problem arising, such as damage to neighbouring properties or environmental harm, it would be difficult for those businesses to show that they were not responsible, or to prove that they were responsible. There would therefore be a higher risk that those businesses could impose uncompensated external costs compared with that of businesses who were making and maintaining accurate records.

It is therefore expected that the 'do nothing' approach would result in private costs and equivalent private benefits. However, in order to ensure that the social benefits are delivered, it is necessary to ensure that there is widespread adoption of record-keeping and consistency in the records that are kept. We consider that this is not possible under a voluntary approach. The base case therefore poses higher risks than the proposed Regulation of not meeting the objectives.

The annual cost of the proposed Regulation is \$1.6 million a year more than the base case, derived by annualising the five-year present cost of the proposal.

At an industry level, the proposed Regulation would impose a cost equivalent to 0.06% of the value added by agricultural enterprises in NSW, which exceeded \$2,500 million a year in 1997–98 (ABS website 2000). Alternatively, the proposed Regulation would impose a cost equivalent to 0.1% of the \$1,650 million cash operating surplus (a broad measure of industry profit) in 1997–98.

At an individual level, the requirement would be for a pesticide user to prepare a record of each pesticide application carried out those days when pesticides were applied (other than records for minor, low-risk or domestic-style uses as exempted in the proposed Regulation). For most agricultural businesses affected by the proposed requirements, and not already keeping records, the number of applications carried out should result in new costs of less than \$50 to \$80 per business per year. For the agricultural industry, this would represent 0.15% of the average \$51,500 cash operating surplus per enterprise recorded in 1996–97 (ABS 1999). For urban pest controllers, it is estimated that the annual cost will be about \$80 per licensed operator.

Against these costs are the following benefits:

- reduced risk of export trade impacts or welfare impacts on domestic consumers of agricultural produce through better compliance with withholding periods
- reduced risk of loss of value of agricultural production that can result through rejection by processors or through not being able to identify the causes of crop damage
- more cost-effective use of EPA resources during investigations and audits
- reduced risk of harm to human health and the environment, resulting from improved compliance with the Pesticides Act through more effective enforcement and hence deterrence, thereby achieving objectives of the Act
- more efficient pesticide use resulting from increased understanding of pesticide use patterns and trends
- more effective scientific research into the impacts of pesticides on human health and the environment
- the option of more effective research into the impacts of pesticides on target pests under field conditions, with the agreement of the record-holder.

The value of the benefit that can be immediately quantified is low, at about \$28,000 a year in saved EPA investigation time. Savings in direct research costs are likely to be of a similar order of magnitude, that is, tens of thousands of dollars per year.

Other benefits, such as reduced risks to human health, environment and trade, are likely to be significantly more valuable but are also more difficult to quantify. These benefits are expected to occur because pesticide users will be more aware of labelling and use requirements and will have a better understanding of the quantities of pesticide used and the time since application. This is expected to lead to reduced risks of residue violations in produce, thereby reducing the risks of domestic consumers receiving contaminated produce and the risks of domestic and export trade impacts. Health benefits are expected to include reduced risks of health effects such as gastrointestinal, respiratory and neurological problems, headaches, nausea, skin irritation and reduced risk of death. Environmental benefits are expected to include reduced acute and chronic toxicity to both aquatic and terrestrial ecosystems, such as impacts on the food chain for aquatic ecosystems and avifauna.

The potential pesticide expenditure savings as a result of better record-keeping are likely to be significant. As described, if records can be used to identify chemical use and expenditure savings of 1% on the 40% to 60% of farms that currently keep no records at all, then savings could be in the vicinity of \$1.0 million to \$1.9 million a year.

The use of record-keeping to improve pesticide use efficiency (for example, through integrated pest management programs) is likely to be associated with other costs, such as the costs of management time, pest counts, or determination of economic injury levels. However, farm-level evaluations of US integrated pest management (IPM) programs in 1994 indicated that such programs generally lowered economic risk, increased yields and in most (but not all) cases reduced pesticide use by 1% to 40%, with programs returning a net benefit. (Norton and Mullen 1994.). Benefits did, however, tend to be greater for high value crops with complex production processes than for grains.

As an example of the benefits possible from integrated pest management, a CSIRO-developed management plan for control of the green vegetable bug increased the value of the Australian pecan crop at Moree by \$1.5 million annually. The plan made the pecan orchard less suitable for breeding of the pest, and the new system was sufficiently successful in that insecticides were no longer required to control the green vegetable bug. (CSIRO 2000.)

It is likely that the proposed record-keeping requirements will bring about some direct cost savings through reduced pesticide expenditures in agriculture, if the records are used for this purpose. The level of reduction required to offset the annual costs of the proposed Regulation is likely to be around 1% to 2%. Overseas studies of integrated pest management programs suggest that this level of reduction is easily achievable in industries that are amenable to such programs. Although some higher-value industries already make use of such programs, it is likely that there remains scope for cost reductions in NSW industries that could significantly or fully offset the cost of the proposed Regulation.

The addition of significant non-quantified benefits therefore allows us to conclude that the proposed Regulation will bring about a significant net benefit to NSW.

### **Assessment of the impact of uncertainties**

The greatest area of uncertainty in costs is the number of pesticide use records that would be made in any year. It is possible that the cost of the proposed Regulation could be \$3.1 million a year rather than \$1.6 million. As described, a range of different types of benefits is expected from the proposed Regulation, and it is believed that the value of these benefits will clearly exceed a cost of \$1.6 million a year.

Using the same assessment approach as earlier, if all other benefits were assigned a value of zero, pesticide expenditure savings identified from examination of records would have to lie in the range of 1.7% to 3.3% at a minimum to offset a cost of \$3.1 million a year. As noted above, savings in the order of 1% to 2% are considered plausible, although there are likely to be some other costs associated with achieving that saving. The value of the other, non-quantifiable benefits (particularly those of reduced residue violation risk and improved compliance with the Act) is likely to be significantly greater than zero, which in turn significantly increases the likelihood that the total benefits would exceed the cost of the proposed Regulation.

It is concluded that despite large uncertainties in costs, it remains likely that the benefits of the proposed Regulation will outweigh the estimated costs.

### **National competition policy assessment**

The NSW Government has agreed that proposals for new legislation that restrict competition will be accompanied by evidence that the legislation is consistent with clause 5(1) of the 1995 Competition Principles Agreement. That clause states that:

The guiding principle is that legislation (including Acts, enactments, Ordinances or Regulations) should not restrict competition unless it can be demonstrated that:

- (a) the benefits of the restriction to the community as a whole outweigh the costs; and
- (b) the objectives of the legislation can only be achieved by restricting competition.

(NCC 1998)

The EPA has assessed the competition policy implications of the proposed Regulation by using guidelines developed by the Centre for International Economics (CIE 1999) for the National Competition Council. Evaluation under the guidelines involved:

- assessing and classifying the objectives of the proposed Regulation
- identifying and assessing the nature of restrictions to competition
- carrying out a benefit–cost analysis of the proposed Regulation
- assessing whether the objective of the proposed Regulation could be achieved by more efficient, pro-competitive means.

The objectives of the proposed Regulation and the Pesticides Act are set out in previous sections of this Regulatory Impact Statement, with the principal objective the maximisation of public

benefits achievable from pesticide use record-keeping in connection with environmental, trade and health issues.

The EPA's review of the proposed Regulation against the guidelines suggests that the Regulation may impose the following competition restrictions in achieving those objectives:

- restriction on the type of input used in the production process
- provision of advantages to some firms over others.

These restrictions are minor and may impose small costs. As shown above, it is believed that the private and public benefits of the restrictions will outweigh the private costs of compliance.

The Competition Principles Agreement provides an extra test, which is that, despite the proposed Regulation showing a net public benefit, the restriction should still not be imposed unless it is necessary to achieve the objectives. In other words, it should not be imposed if there is a more efficient, pro-competitive way of achieving the outcome.

The principal alternative to the proposed Regulation has already been assessed. That assessment showed that the principal alternative (voluntary record-keeping) would not achieve the objective of the proposed Regulation because it would potentially allow poor environmental performers to avoid record-keeping. This would prevent the objective from being achieved because public benefits from record-keeping would not be maximised.

For comparison with other States, record-keeping was considered in a National Competition Review of Agricultural and Veterinary Chemicals control-of-use legislation in Queensland, Victoria, Tasmania and Western Australia, as described earlier. In those States, commercial pesticide applicators must be licensed. The review team recommended that licensing be retained and that record-keeping be retained as a licence requirement, being 'strongly associated with good practice' (PWC and FAL 1999, p. 89). Commercial pesticide applicators in NSW will therefore face the same record-keeping requirements as their colleagues in other States, but will not face the requirement to obtain and hold a licence.

The review team also recommended retaining an exemption from pesticide use licensing for primary producers, but clearly specified that the exemption did not apply to generic controls on use. The principal example of generic controls given was the requirement for Farmcare accreditation in order to gain access to Schedule 7 chemicals in Victoria. (PWC and FAL 1999, p. 90). As described above, primary producers in NSW will have to keep records of some types of pesticide applications; this will not be required of their colleagues in all of the other States. However, the proposed record-keeping requirements are generic controls that fall within the scope of the recommendations made in the National Competition Review of control of use legislation, and hence are considered acceptable under the National Competition Policy.

It is therefore considered that, in this case, the small potential restrictions on competition are necessary to achieve the objective of the proposed Regulation and will bring about a net public benefit. The requirements of the Competition Principles Agreement are therefore met and the proposed Regulation is consistent with the National Competition Policy.

## CONCLUSION

The Regulatory Impact Statement finds that both the costs and benefits of the proposed Regulation are likely to exceed those of the principal alternative, principally because the proposed Regulation will achieve a high level of record-keeping in a much shorter time than will the alternative.

Quantified incremental costs of the proposed Regulation compared with the base case are estimated at \$1.6 million a year, equivalent to a present cost of \$6.6 million over five years at a discount rate of 7%.

Quantified incremental benefits of the proposed Regulation are small, at about \$28,000 a year in reduced investigation time. However, the proposed Regulation also returns unquantified benefits of:

- reduced risk of trade impacts
- reduced risk of lowered agricultural production value
- more effective investigations into pesticide incidents
- reduced incidence of environmental or health effects from pesticide use
- more efficient pesticide use and expenditures from improved understanding of pesticide use patterns and trends
- reduced costs and increased effectiveness of scientific studies.

The major social benefits are reduced risk to trade and consumer welfare, and reduced risk of harm to human health and the environment through improved compliance with the Pesticides Act.

Pesticide users are likely to gain private benefits through greater confidence that agricultural production meets produce quality standards, better understanding of pesticide use patterns and purchase requirements, and more accurate identification of causes of production problems. It is expected that these benefits will include a reduction in pesticide expenditure without a corresponding loss of production; this can be quantified as a potential saving of \$1.0 million to \$1.9 million a year for every 1% reduction in pesticide use that results from the proposed Regulation.

Other social benefits may also come about if records are available to reduce costs of research into the impacts of pesticides on the environment, human health, plants and animals protected by the pesticides and/or the target pests.

At an industry level, the total annualised cost of the proposed Regulation is estimated at about 0.06% of the value added by the agricultural, forestry and fishing sector in NSW, which is the largest sector affected by the proposed Regulation.

At an individual business level, it is estimated that the cost to most businesses or operators affected by the record-keeping requirements for the first time will be less than \$50 to \$80 a year, with the cost principally occurring as an opportunity cost of time that could be dedicated to other activities.

We believe that the relatively low costs of the proposal to individual affected businesses and to the NSW economy will be significantly outweighed by benefits from better pesticide expenditure decisions, improved compliance with the Pesticides Act and a reduced risk of residue violation.

We therefore conclude that the proposed Regulation should be made.

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# **APPENDIX 1: METHODOLOGY AND ASSUMPTIONS USED TO CALCULATE PESTICIDE APPLICATION NUMBERS AND RECORD-KEEPING COSTS**

## **1. Numbers of pesticide applications per year**

There is no information on the numbers of pesticide applications made by industry each year, other than records held under licence by aerial applicators and urban pest controllers and voluntarily by some other industry groups.

The EPA identified the main types of groups likely to be affected by the proposed Regulation owing to their use of pesticides for commercial purposes. Estimates of the number of pesticide users in the agricultural industry were drawn from Australian Bureau of Statistics information. Numbers of ground-rig operators, golf courses and bowling clubs were obtained from industry associations.

To estimate the number of pesticide applications across different industries, discussions were held with industry and government contacts with knowledge of pesticide use practices in each industry.

The information obtained is shown in Table A1.1.

Note that the number of stakeholders for each industry/organisation represents the number of businesses/entities and not the number of people applying pesticides.

Numbers for aerial applicators, pest controllers and fumigators have been excluded from the totals in Table A1.1 because those groups already keep records as a licence requirement or as a matter of practice. While there will be costs to those industries from the proposed Regulation, those costs are likely to be significantly lower than the costs to the other industries shown and so are treated separately in the analysis.

In the case of aerial applicators and ground-rig operators, the pesticide applications carried out should (in theory) already be counted in the statistics for agriculture. To include separate application numbers for these groups would be double counting. However, ground-rig operators are not presently required to keep records. Figures for ground-rig operators are identified in Table A1.1 but are not included in the total.



**Table A1.1. Estimated pesticide users and application numbers by industry**

Stakeholder group	No. of stakeholders	No. of applications per year per stakeholder		Total no. of applications per year per stakeholder group	
		Low	High	Low	High
<b>Agriculture</b>					
Plant nurseries	735	50	50	36,750	36,750
Cut flower	278	50	50	13,900	13,900
Vegetables	777	4	6	3,108	4,662
Grapes	908	5	10	4,540	9,080
Apple and pear	250	4	12	1,000	3,000
Stone fruit	451	4	12	1,804	5,412
Kiwi fruit	40	4	12	160	480
Other fruit	1,926	4	12	7,704	23,112
Grain	4,287	4	5	17,148	21,435
Grain-sheep/beef	7,355	1	8	7,355	58,840
Sheep-beef cattle	3,853	1	8	3,853	30,824
Sheep	5,383	1	2	5,383	10,766
Beef	9,464	1	8	9,464	75,712
Dairy	2,105	15	20	31,575	42,100
Poultry (meat)	376	6	6	2,256	2,256
Poultry (eggs)	131	6	6	786	786
Pig	356	2	6	712	2,136
Horse	600	1	2	600	1,200
Deer	60	1	2	60	120
Other livestock	173	1	8	173	1,384
Sugar cane	473	1	2	473	946
Cotton	569	6	15	3,414	8,535
Other crops	301	4	8	1,204	2,408
Other agriculture	1,644	1	4	1,644	6,576
Rural Land Protection Boards	48	900	900	43,200	43,200
Bees	527	1	1	527	527

Stakeholder group	No. of stakeholders	No. of applications per year per stakeholder		Total no. of applications per year per stakeholder group	
		Low	High	Low	High
<b>Other</b>					
Golf courses	401	5	10	2,005	4,010
Bowling clubs	665	20	20	13,300	13,300
Councils	177	100	260	17,700	46,020
Government sector	5	2,000	2,000	10,000	10,000
<b>TOTAL</b>	<b>44,329</b>			<b>247,398</b>	<b>487,217</b>
<i>Ground-rig operators</i>	<i>130</i>	<i>280</i>	<i>280</i>	<i>36,400</i>	<i>36,400</i>
<i>Aerial applicators</i>	<i>325</i>	<i>–</i>	<i>–</i>	<i>–</i>	<i>–</i>
<i>Pest controllers and fumigators</i>	<i>1,904</i>	<i>200</i>	<i>200</i>	<i>380,800</i>	<i>380,800</i>

## 2. Record-keeping costs

The EPA asked industry contacts involved with existing record-keeping requirements about the length of time it currently takes to fill out aerial applicator record sheets and the NRA's endosulfan spray record form. Industry contacts were also asked to estimate the length of time it would take to prepare a record with the proposed requirements.

It was estimated that making a single record complying with the requirements for aerial applicators takes about 10 minutes.

To make a single record of endosulfan spray use was estimated to take between 20 and 30 minutes.

To make a record that meets the proposed requirements was estimated to take about 10 minutes, which is also the time estimated to meet the existing aerial applicator requirements. The proposed requirements are slightly more extensive than the existing aerial applicator requirements, so in theory should take slightly longer. However, the additional requirements are target pest and application rate, and the additional time needed to make records of these matters is relatively small compared to the time required to make the principal record.

The final component to estimating the cost of making a record is to estimate the opportunity cost to each pesticide user of the time taken to make the record. Opportunity cost occurs when an alternative opportunity is not taken. For example, if making a record were not required, a pesticide user could instead use the time to carry out equipment maintenance, deal with finances or engage in a recreational activity. The first two examples involve an alternative use of commercial time, while the latter is a case of recreational time being given up for commercial time.

As such, it is difficult to determine what value to use for the opportunity cost of time, since the value of commercial time differs across industries, and the value of recreational time differs

among people. One method is simply to use the average hourly rate given by the average weekly ordinary time earnings divided by average weekly hours worked. For Australia, these figures are \$791 (May 1999)<sup>5</sup> and 41.1 person-hours per week (average for 1998–99)<sup>6</sup>. This gives an hourly cost of \$19.25.

This may not be equal to the opportunity cost or hourly income for participants in each industry involved, as it is likely that the opportunity cost of time varies significantly across different agricultural enterprises, local government, commercial pesticide applicators and other public authorities. Because of the difficulty of disaggregating income data into those groups, the average figures for the workforce have been used instead.

It is then normal to increase this figure to represent overhead and fixed costs incurred by each group. For example, there are requirements to provide for superannuation and there may be payroll taxes and workers' compensation insurance payments. In addition, hourly costs need to reflect business overheads (for example rents, vehicles, electricity, computers and telecommunications). The usual factor to apply is a loading of 30%. This raises the hourly cost to \$25. Ten minutes is therefore valued at \$4.15 and 20 to 30 minutes is valued at \$8.35 to \$12.50 (rounding to the nearest 5 cents).

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<sup>5</sup> Average total weekly earnings, full-time employed persons. ABS 2000. 'Australia now: a statistical profile'/Labour: <http://www.abs.gov.au>. 10 July 2000.

<sup>6</sup> Average weekly hours for people full-time employed in agriculture, forestry and fishing. ABS 2000. 'Australia now: a statistical profile'/Hours of work and work patterns: <http://www.abs.gov.au>. 10 July 2000.

## **APPENDIX 2: SAMPLE FORM AND OTHER GUIDANCE**

### **RECORD OF PESTICIDE USE — Agricultural use**

#### **About this record-keeping sample form**

This record-keeping sample form provides guidance only on information that is required to be kept under the proposed Regulation. The layout of this sample form is provided as an example only of how that information might be kept. Any alternative layout will be acceptable, as long as it provides for clear and easy access to the required information—for example, the required information could be kept on a computer spreadsheet or as a hand-written record.

It is also important to recognise that while all of the information fields would need to be covered, the level of detail that it is appropriate to record may vary according to the circumstances of the application.

Please remember that additional mandatory record-keeping may be required on the basis of the type of chemical used. For example, more extensive record-keeping is a National Registration Authority label requirement for some chemicals, including endosulfan.

To ensure the Regulation is workable, efforts will be made to ensure that the sample form is as user friendly as possible.

## RECORD OF PESTICIDE USE (Suggested format only)

**All copies of recorded information must be kept for a minimum of three years.**

**User details:**

Pesticide applicator's name in full:		
Or Company name (if employed to carry out this application by a registered company):		
Street address:		
Phone:	Fax:	E-mail

**Job details:**

Date of application	Start time	Finish time

**Pesticide details:**

Full product name as it appears on the label	Rate of application	Quantity of concentrate applied	Target pest or pests

**Application details:**

Equipment used (including the registration mark of any aircraft used in the application of the pesticides) (e.g. backpack sprayer, tractor-mounted boom, airblast sprayer, hand duster, aircraft)

Equipment settings (e.g. nozzle type, nozzle angles, pressure, air flow rates)

Address and specific location of land treated (Include the full residential address of the treated property or the block or paddock reference number or name, as well as the area sprayed within the property or paddock. A sketch map may be needed to fully identify the area sprayed.)

Description of the area treated or affected (e.g. growth stage of crop sprayed, condition of crop, proximity of sensitive environments and/or buffer zones to area of application)

Description of how the pesticide was applied (e.g. direction of spray run, sequence in which paddocks/areas/rooms of a property were sprayed, including locations of first and last spray run).

**Weather conditions for outdoor applications that distribute pesticide spray or powder through the air:**

General weather conditions (e.g. showers, overcast, light cloud)	
Temperature	<i>Before application:</i> <i>Significant changes during application:</i>
Wind speed (in km/h, knots or m/s, or recorded in the Beaufort scale)	<i>Before application:</i> <i>Significant changes during application:</i>
Direction wind is coming from (e.g. N, S, WSW)	<i>Before application:</i> <i>Significant changes during application:</i>
Wind description (e.g. gusty, strong, calm)	<i>Before application:</i> <i>Significant changes during application:</i>

**Comments:**

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**Do I need to keep a record?**

You must keep recorded information for a minimum of **three** years, except where your employer keeps the record, in which case they must keep it for a minimum of three years. It must be made available on request to an authorised officer from the EPA.

**How many copies should I make?**

In the case of agricultural applications you must give a copy of your record to the occupier or owner of the property to which the pesticide has been applied.

**APPENDIX 3: PROPOSED PESTICIDES AMENDMENT (RECORDS)  
REGULATION 2000**

# APPENDIX 3: PROPOSED PESTICIDES AMENDMENT (RECORDS) REGULATION 2000

## Pesticides Amendment (Records) Regulation 2000

under the

Pesticides Act 1999

His Excellency the Governor, with the advice of the Executive Council, has made the following Regulation under the *Pesticides Act 1999*.

Minister for the Environment

### Explanatory note

The objects of this Regulation are as follows:

- (a) to provide that records of aerial applications of pesticides, which are required to be made by holders of an aircraft (pesticide applicator) licence under the *Pesticides Act 1999*, must contain particulars as to the type of pests targeted in the application of the pesticide concerned, the rate of application and the quantity applied (Schedule 1 [1]),
- (b) to require persons who use pesticides for commercial or occupational purposes, or in connection with agricultural, farming or forestry operations, to make and keep records in relation to the use of pesticides (Schedule 1 [2]),
- (c) to provide for offences in relation to the new requirements under the Regulation to be dealt with by way of penalty notice (Schedule 1 [3]).

With respect to the object referred to in paragraph (b), this Regulation inserts Part 4A in the *Pesticides Regulation 1995*. Clause 11B provides that a person who uses a pesticide for commercial or occupational purposes, that is, when carrying on a business involving the use of pesticides, or while acting as a landlord, or while carrying out pest control operations for or on behalf of a public authority or on a golf course or bowling green, must make a record in relation to the use of the pesticide. Clause 11C provides that a person who uses a pesticide in connection



with any agricultural, farming or forestry operation will also be required to make a record as to the use of the pesticide, but only when using a pesticide in certain specified circumstances (eg whenever spray equipment is used to spray horticultural crops).

Clause 11D sets out the information that must be contained in a record required to be made under Part 4A. A record must be made no later than 24 hours after the use of the pesticide, and must be kept for at least 3 years from when it was made. Clause 11F provides that the owner or occupier of land on which a pesticide is used in connection with any agricultural, farming or forestry operations must be provided with, and is required to keep, a copy of the record made by the person who used the pesticide concerned. Clause 11G makes it an offence for a person, in any record required under Part 4A, to make a statement, or to provide any information, that is false or misleading in a material particular. Clause 11H provides that the EPA may exempt persons from any of the record making and keeping requirements under Part 4A.

This Regulation is made under the *Pesticides Act 1999*, including sections 54 (2) (g), 117 and 119 (the general regulation-making power), in particular section 119 (2) (e) and (o).

## **Pesticides Amendment (Records) Regulation 2000**

### **1 Name of Regulation**

This Regulation is the *Pesticides Amendment (Records) Regulation 2000*.

### **2 Commencement**

This Regulation commences on 30 November 2000.

### **3 Amendment of Pesticides Regulation 1995**

The *Pesticides Regulation 1995* is amended as set out in Schedule 1.

### **4 Notes**

The explanatory note does not form part of this Regulation.

## Schedule 1 Amendments

(Clause 3)

### [1] Clause 6A

Insert after clause 6:

#### **6A Records of aerial application of pesticides**

For the purposes of section 54 (2) (g) of the Act, the following particulars are required to be contained in a record made under that section:

- (a) the pest or pests targeted in the application of the pesticide,
- (b) the rate of application of the pesticide and the quantity applied.

### [2] Part 4A

Insert after Part 4:

## **Part 4A Records relating to use of pesticides**

### **11A Application of Part**

This Part does not apply to or in respect of aerial pesticide operations for which a licence is required under the Act.

### **11B Requirement to make records relating to use of pesticides for commercial and other related purposes**

- (1) A person must make a record, in accordance with clause 11D, that relates to each occasion on which the person uses a pesticide:
  - (a) in the course of carrying on a business involving the use of pesticides, or
  - (b) while acting in the capacity as landlord of the premises on which the pesticide is used, or

- (c) while carrying out pest control operations for or on behalf of a public authority, or
- (d) while carrying out pest control operations on a golf course or bowling green.

Maximum penalty: 400 penalty units in the case of a corporation, or 200 penalty units in the case of an individual.

- (2) Subclause (1) (a) applies regardless of whether the use of pesticides is the primary purpose of the business concerned.
- (3) However, subclause (1) (a) does not apply in relation to the use of a pesticide (other than a fumigant) that:
  - (a) is ordinarily used for home gardening or other domestic purposes, and
  - (b) is readily available to the general public at a shop or other retail outlet, and
  - (c) has been obtained by or for the person using it in a package or container no larger than what is readily available to the general public at a shop or other retail outlet.
- (4) This clause does not apply to persons to whom clause 11C applies.

**11C Requirement to make records relating to use of pesticides in connection with agricultural, farming or forestry operations**

- (1) This clause applies to persons who use pesticides in connection with any agricultural, farming or forestry operations.
- (2) A person to whom this clause applies must make a record, in accordance with clause 11D, that relates to each occasion on which the person uses a pesticide in any of the circumstances described in subclause (3).

Maximum penalty: 400 penalty units in the case of a corporation, or 200 penalty units in the case of an individual.

- (3) The circumstances in which a record is required to be made are as follows:
  - (a) whenever livestock are treated for ectoparasites by means of a dip bath or by the use of powered spray equipment that is not hand held,

- (b) whenever harvested horticultural crops are treated by means of a dip bath,
- (c) whenever spray equipment of any type is used to spray horticultural crops,
- (d) whenever powered spray equipment is used to spray crops (other than horticultural crops), or trees in a plantation,
- (e) whenever ground driven powered spray equipment that is not hand held is used,
- (f) whenever baits are applied to control vertebrate pests (other than baits that are used to control rodents in or around buildings).

(4) In this clause:

***ground driven powered spray equipment*** means powered spray equipment that is mounted on or attached to a vehicle.

***horticultural crops*** means fruit, vegetables, flowers, nuts and herbs.

***powered spray equipment*** means spray equipment that is powered otherwise than by human energy.

***spray equipment*** means any device or apparatus that distributes pesticide through the air, and includes ground driven powered spray equipment and powered spray equipment.

#### **11D Information to be contained in record**

- (1) A record required to be made under clause 11B or 11C must contain the following information:
  - (a) the full product name of the pesticide applied,
  - (b) the pest or pests targeted in the application of the pesticide,
  - (c) the rate of application of the pesticide and the quantity applied,
  - (d) a description of the equipment used to apply the pesticide,
  - (e) a description of the manner in which the pesticide was applied,

- (f) a general description of the area treated or affected by the pesticide,
  - (g) the specific location and address where the pesticide was applied,
  - (h) the date and times of the application of the pesticide (including the start and finish time),
  - (i) the name, address and contact details of the person who used the pesticide or, if the pesticide was applied by a person employed to apply the pesticide, the name, address and contact details of the person's employer,
  - (j) the name, address and contact details of the owner or occupier of the land in respect of which the pesticide was applied (if the information is not the same as the information required by paragraph (i)),
  - (k) if the pesticide is applied outdoors by means of any spray equipment within the meaning of clause 11C—a description of the weather conditions (including wind speed and direction, and temperature) immediately before and during the application of the pesticide.
- (2) The record must:
- (a) be made as soon as practicable after the use of the pesticide concerned and, in any event, no later than 24 hours after the pesticide is used, and
  - (b) be in writing and legible.

**11E Keeping of records**

A person who is required to make a record under clause 11B or 11C must keep the record for a period of not less than 3 years after the date on which the record was made.

Maximum penalty: 400 penalty units in the case of a corporation, or 200 penalty units in the case of an individual.

**11F Owner or occupier of certain land to be provided with copy of record**

- (1) This clause applies if:
  - (a) a person uses a pesticide on land in connection with any agricultural, farming or forestry operations, and
  - (b) the person is not the owner or occupier of the land.
- (2) The person who uses the pesticide must provide the owner or occupier of the land with a copy of the record required to be made by the person under clause 11C.

Maximum penalty: 400 penalty units in the case of a corporation, or 200 penalty units in the case of an individual.

- (3) The owner or occupier must keep the copy of the record for a period of at least 3 years after the date on which the owner or occupier is provided with the copy.

Maximum penalty: 300 penalty units in the case of a corporation, or 150 penalty units in the case of an individual.

**11G False or misleading information in record**

A person must not, in any record required to be made under clause 11B or 11C, make any statement, or include any information, that is false or misleading in a material particular.

Maximum penalty: 400 penalty units in the case of a corporation, or 200 penalty units in the case of an individual.

**11H Exemption from record keeping requirements**

- (1) The Environment Protection Authority may, by notice published in the Gazette, exempt a specified person or specified class of persons from any requirement under this Part.
- (2) Without limiting subclause (1), an exemption may relate to particular kinds of information referred to in clause 11D.
- (3) Before making an exemption under this clause, the Authority is required to consult the Implementation Committee and such other relevant persons as the Authority thinks appropriate.

**11I Integration with other record keeping requirements**

The Environment Protection Authority may approve, either in a particular case or generally, of the integration of records that are required to be made and kept under this Part with other records that are required to be made and kept under any other law.

**[3] Schedule 1 Penalty notice offences and short descriptions**

Insert at the end of the Schedule:

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>	<b>Column 5</b>	<b>Column 6</b>
<b>Provision of this Regn</b>	<b>IPB Code (indivs)</b>	<b>IPB Code (corpns)</b>	<b>Short description code</b>	<b>Penalty \$ (indivs)</b>	<b>Penalty \$ (corpns)</b>
Clause 11B (1)	—	—	not make record of pesticide use	400	800
Clause 11C (2)	—	—	not make record of pesticide use	400	800
Clause 11F (2)	—	—	not provide copy of record to owner or occupier	150	300
Clause 11F (3)	—	—	owner/ occupier not keep record	150	300
Clause 11G	—	—	make/ include false/ misleading statement/ information	200	400