

without an initial sale until two weeks ago. It has taken 8.5 years of the 17 year Australian patent to achieve this.

Monsanto are keen to see it deliver net positive returns as soon as possible. Realistically this will take two to three years on our predicted sales volumes. Of course the challenge is to bring this forward.

Application

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Details of this presentation are available from the author at the above address.

End users and the environment/consumer

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Pest Control Unit

The Pest Control Unit of the Department of Health and Community Services administers registration of Pest Control Operators and the licensing of pesticide users. Its functions are to ensure that standards are being enforced and that chemicals are used safely, effectively and in a manner which does not place the community at risk. This is achieved by regulating the standards of training and operation required by Victorian pest control businesses and their employees, inspection and surveillance of the pest control industry and provision of advice on the technical and health aspects of pesticide usage.

The legislation relating to Pest Control Operators is found in Sections 108 A to H of Division 2A of the Health Act 1958. It requires that pest control businesses applying registered pesticides should be registered and licensed by the Department of Health and Community Services (Sections 108 B and C).

When pesticides are used in the course of the business of a pest control operator, they must be used according to the Health (Pest Control Operators) Regulations 1992.

Weeds, or other vegetation, which inhibit intended growth on urban, industrial, municipal or public lands are prescribed as pests.

The prescribed qualification for the granting of a licence that authorizes the use of pesticides that have been formu-

lated for the control of weeds is the completion of at least one of the approved courses. These are:

In Victoria:

- Certificate in Weed Control conducted by Northern and Metropolitan College of TAFE, Tel: (03) 387 3255.
- Pest Plant Management Course conducted by Victorian College of Agriculture and Horticulture Creswick Forestry School, Tel: (053) 452 100.
- Weed Identification and Their Control conducted by Commercial Pest Training Services, PO Box 434, Yarrowonga, Vic 3730, Tel: (057) 442 205 also in conjunction with the Herbicide Applicators Association of Victoria, Tel: (03) 844 4380.

In South Australia:

- South Australia Weed Control Certificate Course conducted by Gilles Plains College of TAFE.

The licence endorsement for weeds is a general one and is not intended to be limited to a specific type of application. Therefore the Department of Health and Community Services is of the opinion that a course tailored to the needs of herbicide users should maximize the public health perspective. There is a need for careful weed identification and herbicide selection and application. Problems associated with spray drift, herbicide resistance, run-off into aquatic systems and the associated appearance of nuisance algae or contamination of drinking water are all

public health issues.

With the introduction of the new regulations, a the three tiered licensing system was implemented on 1 January 1993. Guidelines outlining this system are available from the Pest Control Unit.

- i. Trainee. A new employee of a pest control business who has no training or experience will be given a "trainee" licence to allow the appropriate experience to be gained under supervision while the prescribed qualifications are completed.
- ii. Technician. A technicians licence is given when the qualifications are completed usually after one year of employment. This allows the licence holder to work with minimal supervision.
- iii. Technical Manager. After at least two years experience in the industry a technician may apply for a technical managers licence. A technical managers licence allows the licence holder to operate as a pest control operator business.

As an interim measure during the first year of implementation of these regulations, experienced herbicide applicators were given a technicians licence with a requirement to complete an approved course which was specifically tailored to herbicide use. This allowed owner operators to register their business and continue to operate until fully qualified.

A "business" is established if it can be proved that a person is engaged in a commercial activity, even of an intermittent kind, where there is an ultimate expectation of commercial gain. Therefore although pest control businesses are required to be licensed with the Department of Health and Community Services, employees of government departments or

local government are not required to hold a licence. Contract work for councils or government departments is considered to be a commercial activity and requires the contractor to be registered and licensed with this department if the work is the control of weeds on urban, industrial, municipal or public lands.

There has been some confusion as to what constitutes 'public' land. To assist in handling inquiries about where the Department of Health and Community Services licence is required a list of specific examples is available from officers of the Pest Control Unit. Pest Control Operators who are contracted to control weeds on agricultural lands are not required to have a licence with this department as they are considered to be regulated by the Department of Agriculture.

The Pest Control Unit is concerned with issues relating to the health of pesticide users as well as public health. As well as ensuring that operators are adequately trained and experienced, the Pest Control

Unit is developing a targeted inspection program of pest control operators to enable high risk operators to be given inspection priority and to improve compliance with regulations and departmental guidelines. An inspection will involve checking of storage and record keeping of chemicals, inspection of vehicles and equipment as well as an assessment of practical skills.

Pest control businesses are required to keep records of all pesticides used in their business. Licence holders are required to provide their employer with the following information:

- date of application
- name of pesticide used
- address where it was used
- location of treatment (i.e., roof void, sub-floor, fence)
- purpose of treatment
- applicators name and licence number

Licensed pesticide users are required to operate from vehicles using equipment to the standard specified in the Department

of Health and Community Services Vehicle and Equipment Guidelines.

The regulations do not apply to anyone who only applies a herbicide which is exempted, with hand-pumped equipment that has a tank capacity of 10 litres or less. Exempted herbicides are:

- ethidimuron
- ethofumesate
- glyphosate
- karbutilate
- propyzamide
- siduron
- copper salts

As well as its administrative role, the Pest Control Unit also provides advice and assistance to the public, industry and local government on matters regarding health and technical information and pesticide usage. A number of pamphlets are available to assist with these inquiries.

For further information contact Environmental Health Program. Tel: (03) 616 7766. Fax: (03) 616 7347.

The triazine herbicide atrazine – are you effectively adopting risk minimization practices?

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Introduction

DDT controversies of the 1960s, phenoxy herbicide controversies of the 1960s, 1970s and 1980s. Will it be the triazine herbicide controversies of the 1980s, 1990s and into the year 2000? Investigations in the next few years in Australia may prove this to be the case. This paper is about the herbicide atrazine and recognition of the need to develop and utilize sustainable agricultural and horticultural practices which will have minimal impact on the environment. Sustainable urban space management programs, as well as agricultural and horticultural weed control programs must always endeavour to minimize the risks to both the end user, the community and the environment as a whole. But first to raise a number of issues by way of introduction.

Herbicides happen to be one group of chemicals which have played a valuable role in vegetation management. They have also been the focal point, particularly in urban areas, for expressions of concerns about agrochemical usage. Since the bulk of agricultural chemicals used in urban areas consists of herbicides, it is an interesting exercise to reflect on the parallels between the controversy surrounding the phenoxy herbicides 2,4-D and 2,4,5-T, and human health effects which ran for

almost 20 years and the triazine herbicides, particularly with respect to atrazine and ground water contamination. Fortunately, the issue is not clouded with any problems with contamination of the commercial product as was the case with 2,4,5-T. But attempts to link atrazine with human health problems appear as tenuous as with 2,4,5-T at present.

Atrazine, like the phenoxy herbicides, in some respects has been in use for more than 30 years providing excellent weed control within selected crops and forest species and is efficacious on a range of difficult weed species, notwithstanding the contribution to minimum tillage practices designed to improve soil moisture retention and avoid the structural degradation of cropping soils.

If there was a serious problem with atrazine, one would have expected a problem to have emerged by now. However, since the 1980s studies (Hallberg 1989) on chemicals generally in ground water have been steadily emerging, mainly concentrating on mobile compounds, volatile soil fumigants, nematicides, herbicides, including atrazine and nitrate fertilizers. The focus of such studies has tended to be on leaching from potential routine point sources normally

associated with intensive agriculture production, but does not exclude potential non point sources concerned with the storage and manufacturing of agrochemicals. Such sites would be where high concentrations of herbicide have occurred in well defined areas through mishandling or storage problems.

Concerns about atrazine primarily began to be raised when water quality reports (Hallberg 1989) in the 1980s conducted in a number of countries revealed the presence of atrazine. This was not particularly startling news since in the mid 1970s investigations concerning organochlorine insecticide reported by Richard *et al.* (1975) also analysed for atrazine successfully. Water quality reports conducted in studies in Wisconsin and Iowa, for example, in the USA indicated that atrazine was the most commonly detected herbicide in ground water. However, in a nationally conducted EPA study in the USA, almost 99% of all wells across the USA recorded no detectable level of atrazine. The focus of these earlier studies appears to be on hot spots or non point sources in high use areas associated with intensive agricultural production and chemical usage.

It should also be pointed out that extrapolation from information generated in areas such as the prime corn belt growing areas of the USA and specific areas such as the Columbia basin needs to be done, if at all, with extreme caution since soil conditions are quite different in terms of soil profiles in these areas. Intensively cropped loams are often underlain by beds of gravel and sand connected to ground water supplies. Such conditions are linked with glacial activity and quite