



**National
Registration
Authority**

For Agricultural & Veterinary Chemicals

DIURON

REVIEW SCOPE DOCUMENT

DECEMBER 2002

**National Registration Authority
for Agricultural and Veterinary Chemicals**

**Canberra
Australia**

© National Registration Authority for Agricultural and Veterinary Chemicals

ISSN Number 1443 2528

This work is copyright. Apart from any use permitted under the *Copyright Act 1968*, no part may be reproduced without permission from the National Registration Authority for Agricultural and Veterinary Chemicals.

This scope document for the review of diuron is published by the National Registration Authority for Agricultural and Veterinary Chemicals. For further information about this review or the Chemical Review Program, contact:

Program Manager, Pesticides Division
National Registration Authority for Agricultural and Veterinary Chemicals
PO Box E240
KINGSTON ACT 2604
Australia

Telephone: +61 2 6272 3213
Facsimile: +61 2 6272 3551
Email: chemrev@nra.gov.au
NRA web site: <http://www.nra.gov.au>

Review Scope Document

Diuron

SUMMARY

The NRA has initiated its reconsideration of the approvals of the active constituent diuron, the registrations of products containing diuron and the approvals of associated labels. The purpose of this document is to define the scope of the matters of concern to the NRA and to outline the data necessary for the NRA to conduct a comprehensive scientific assessment of diuron.

Approvals of the active constituent diuron are being reconsidered to assess whether the toxicities of two impurities, 3,3',4,4'-tetrachloroazobenzene and 3,3',4,4'-tetrachloroazoxybenzene (both specified in the minimum compositional standard (MCS) for diuron), may have an effect that is harmful to human beings. Registrations of products containing diuron and all associated label approvals are being reconsidered to assess concerns that use of diuron products in certain circumstances may be likely to be harmful to the environment.

The reconsiderations will be made after the NRA assesses all the data and other information provided to it for this purpose – the assessment process is hereafter referred to as 'review'. It is anticipated that a draft report of the NRA's review will be available for public comment mid-2004.

The NRA's review will examine the following matters:

- Toxicology of two impurities (3,3',4,4'-tetrachloroazobenzene and 3,3',4,4'-tetrachloroazoxybenzene) specified in the MCS for diuron active constituent.
- Environmental effects, including:
 - impact of runoff water containing diuron on the Great Barrier Reef;
 - the impact of diuron found in sediment and water on various species of sea grass;
 - the potential role of diuron as a cause of dieback in mangroves; and
 - the possible contribution of diuron in run-off water to reported incidents of off-target damage to farmlands.
- The adequacy of instructions and warnings on product labels.

Data addressing these concerns, as detailed in Section 3.1, must reach the NRA by **20 February 2003**.

1. INTRODUCTION

Section 31 of the Agricultural and Veterinary Chemicals Code Act 1994 of each of the States and Territories (the Agvet Codes), authorises the NRA to reconsider:

- (a) the approval of an active constituent for a proposed or existing chemical product;
- (b) the registration of a chemical product; and
- (c) the approval of a label for containers for a chemical product.

The NRA has decided to reconsider the approvals of the active constituent diuron, the registrations of products containing diuron and the approvals of associated labels, based on concerns over toxicology and environmental safety.

For information on the NRA's legislative responsibilities and The Chemical Review Program, please refer to the NRA website <http://www.nra.gov.au>.

2 NOMINATION OF THE CHEMICAL

Diuron (1,1-dimethyl, 3-(3',4'-dichlorophenyl) urea) is a substituted urea compound with herbicidal and algacidal properties.

The main concerns that led to the nomination of diuron for review related to the potential for environmental contamination, particularly of the marine environment. Concerns have also been raised about the possible toxicity of some impurities in the active constituent. The details of the concerns which have been raised can be found in Sections 5 and 6 of this report.

3 SCOPE OF THE REVIEW

In light of concerns raised by Environment Australia (see Section 5), it appears that the NRA might not be able to maintain its satisfaction that continued registration of products containing diuron would not have an unintended effect that is harmful to the environment.

Similarly, given the concerns raised by Therapeutic Goods Administration (see Section 6), it appears that the NRA might not be able to maintain its satisfaction that continued approval of the active constituent diuron would not be likely to have an effect that is harmful to human beings.

In light of concerns that have been raised, it is appropriate that the registrations and approvals of diuron be subject to reconsideration under Part 2, Division 4, of the Agvet Codes.

The NRA will therefore review the following aspects of active constituent approvals, product registrations and label approvals for diuron:

- Toxicology of two impurities (3,3',4,4'-tetrachloroazobenzene and 3,3',4,4'-tetrachloroazoxybenzene) specified in the MCS for diuron active constituent.
- Environmental effects, including:
 - impact of runoff water containing diuron on the Great Barrier Reef;
 - the impact of diuron found in sediment and water on various species of sea grass;
 - the potential role of diuron as a cause of dieback in mangroves; and
 - the possible contribution of diuron in run-off water to reported incidents of off-target damage to farmlands.
- The adequacy of instructions and warnings on product labels.

3.1 Data requirements

Registrants will be notified of specific data requirements that they must attend to. Other interested parties are invited to examine their data holdings with a view to meeting these data requirements.

3.1.1 Environmental Data

Specific environmental data requirements for the reconsiderations relevant to diuron are to correspond with **Part 7** of the NRA's *Ag Requirement Series – Guidelines for registered Agricultural Chemicals*. Data relating to the following matters must be submitted:

7-1 Environmental Chemistry and Fate

- **7.1.3 Extent of and potential for environmental exposure:** (a) amount of chemical to be used and (b) use and application.
- **7.1.4 Physicochemical degradation:** (a) hydrolysis and (b) photodegradation (aqueous and soil).
- **7.1.5 Biodegradation:** (a) soils (aerobic, anaerobic) and (b) water.
- **7.1.6 Mobility:** (b) absorption / desorption and (c) leaching potential, particularly leaching rates of diuron from antifouling coatings.
- **7.1.8 Accumulation / Metabolism:** (b) accumulation potential in soils.

7-2 Environmental Toxicity

- **7.2.6 Non-target vegetation:** (a) results from laboratory tests and (b) observations from field trials/efficacy tests, particularly in relation to damage to mangroves and seagrasses.
- **7.2.7 Assessments of environmental hazards.**

Other Environmental Requirements

- Data or information relating to the following things:
 - any incidence of pollution of soil;
 - runoff linked to harmful effects to non-target organisms; and
 - all monitoring data for diuron (particularly in aquatic systems) that are known to registrants must be given to the NRA.

3.1.2 Toxicology Data

Specific toxicological data requirements necessary for the reconsiderations relevant to diuron are to correspond with Parts 3 and 4 of the NRA's *Ag Requirement Series – Guidelines for registered Agricultural Chemicals*. Data relating to the following matters must be submitted:

- Previously unsubmitted studies on the metabolism, toxicokinetics and toxicology of diuron and two impurities: 3,3',4,4'-tetrachloroazobenzene and 3,3',4,4'-tetrachloroazoxybenzene.
- Previously unsubmitted acute oral, dermal and inhalation toxicity studies, skin and eye irritant studies and skin sensitisation studies with Australian registered diuron products, or similar formulations in cases where studies with registered products are not available.

Other specific toxicological studies that are required to be submitted by registrants are listed below:

- Eiben, R. (1983). Diuron: Study for chronic toxicity and carcinogenicity with NMRI mice (administration in diet for 24 months). Bayer Agricultural Institute of Toxicology, Wuppertal, West Germany du Pont Report No. DIUR/Tox 9.
- Cook, J. (1990). Reproductively and fertility effects with diuron (IN 14740). Multigeneration reproduction studies in rats. EI du Pont de Nemours and Co, Haskell Laboratory of Toxicology and Industrial Medicine. Report No. 560-90.
- Argus Research Laboratories (1986). Developmental toxicity study of H-16035 administered by gavage to rats. Argus Research Laboratories, Horsham, PA Report No. HLO 410-86.
- Argus Research Laboratories (1986). Developmental toxicity study of H-16035 administered by gavage to New Zealand white rabbits. Argus Research Laboratories, Horsham, PA Report No. HLO 332-86.
- Cox, L.R. (1996). Mouse bone marrow micronucleus assay of DPX-M2574-43 (Krovar IDF). Haskell Laboratory of Toxicological and Industrial Medicine, du Pont, Report No. 685-95-, 6/2/96.

3.1.3 Other Data Requirements

Should there be a need for additional data or information, the NRA will notify registrants of new data requirements. Other stakeholders may be informed of those data requirements where relevant.

4 REGULATORY STATUS AND USE PATTERNS OF DIURON IN AUSTRALIA

4.1 Active Constituent and Products

As at 25 November 2002, there were fifteen (15) approvals of diuron active constituent (Appendix 1) and 84 registered products containing the active constituent diuron, with 32 registrants. Of the registered products, 47 contain diuron as the only active constituent (Appendix 2), while the remaining 37 are combination products (Appendix 3). There is a number of different formulation types: aqueous concentrates, dry flowables, emulsions, emulsifiable suspensions, emulsifiable concentrates, granules, paints, soluble powders, suspension concentrates, water-dispersible granules and wettable powders.

4.2 Current use patterns

Diuron is a broad-spectrum residual herbicide used by a diverse range of industries. Diuron acts through the inhibition photosynthesis. It is primarily absorbed through plant roots and has a soil half-life of the order of one hundred days¹. Diuron is registered for pre- and post-emergent control of both broadleaf and grass weeds in wheat, oats, barley, rye, triticale, lupin, sugar cane, cotton, coffee, citrus, apples and pears, pawpaw, pineapples, bananas, grapes, asparagus, peas, cut flowers and various seed crops. It is used for broad-spectrum weed control along fence lines, pipelines, powerlines, railway lines, roads, irrigation channels and ditches, footpaths, in timber yards and storage areas, around commercial, industrial and farm buildings, as well as electrical substations, bridges, tennis courts and petrol storage tanks. Products containing diuron are also registered for use in aquatic weed control, as cotton defoliant, as marine antifouling paints and for control of algae in home aquaria and fishponds.

Queensland Department of Primary Industries has indicated that Queensland producers particularly rely on products containing diuron for weed control in sugarcane, cotton and pineapples. Diuron products also form part of a general weed control program. Diuron products apparently offer a cost-effective (note: the NRA does not have regard to the cost of chemicals), broad-spectrum, flexible method of both pre-emergent and a knockdown weed control in sugarcane. Similarly, diuron products are the principal weed control herbicide for pineapple production. Diuron is claimed to be the herbicide of choice for pineapple growers as it is viewed as being long lasting and effective against weeds while at the same time relatively safe for the pineapple plants compared to some other herbicides.

5 ENVIRONMENTAL ISSUES

The main environmental concern regarding the use of products containing diuron involves contamination of coastal areas in Queensland.

Haynes *et al.*² found low levels of diuron (0.2-10.1 µg/kg) [µ = micro] in subtidal sediment samples from eight locations between the Daintree River and Lucinda, along

the tropical Queensland coast. Partitioning calculations suggest that water concentrations at such locations are likely to be in the range of 0.1-1.0 µg/L. This could be of concern as a second study (Haynes *et al.*³) showed that such levels were harmful to seagrass, causing reduction in photosynthesis rates. Seagrass is an important component of the marine environment and constitutes the major food source for the dugong, a protected marine mammal.

In a study of significant mangrove dieback along approximately 30 km of coastline around the Pioneer River estuary near Mackay, Duke *et al.*⁴ found diuron levels up to 4 µg/kg in sediment. This is below reported toxic level guidelines, however these guidelines are based chiefly on responses of terrestrial plants. There are concerns that marine plants might be more sensitive to diuron. In considering twelve (12) possible causes for the dieback, ranging from storm damage to excess nutrients, Duke *et al.*⁴ concluded that diuron, probably from sugarcane growing, was the most likely cause. However, the paper stressed that its conclusions had not been proven and that more work needed to be done to study the effect of diuron on mangroves.

The Co-operative Research Centre for the Great Barrier Reef World Heritage Area (CRC Reef) and the Great Barrier Reef Marine Park Authority have also expressed concerns regarding diuron in their respective reports^{5, 6} on the impacts of terrestrial runoff and water quality, citing the papers by Haynes *et al.*^{2,3} and Duke *et al.*⁴. These reports discuss diuron as only one of many issues in reef water quality. Other issues discussed include excess nutrient input, increased sediment load and heavy metals.

Findings from field studies conducted in the Bundaberg and Atherton Tablelands areas in Queensland by The CRC for Sustainable Sugar Production (CRC Sugar), have found that levels of pesticide runoff from sugarcane catchments are at times higher than desirable⁷. In a report⁷ to the Queensland Canegrowers' Association, CRC Sugar states that off-site losses of diuron were approximately 1-2% of total input. Studies also found that on one soil type (red ferrosol) there was evidence that diuron is persistent and could result in unacceptable soil accumulations from repeated applications.

As part of its reef campaign, the World Wide Fund for Nature (WWF) published a 'Great Barrier Reef Pollution Report Card'⁸ that discusses adverse impacts on the reef from many factors, including herbicides, by agricultural industries located along the coastline, particularly the sugarcane and cattle industries. The claims made by WWF have been disputed by the Queensland Canegrowers' Association in a report published by the Institute of Public Administration⁹. The report stated that diuron is used in marine antifouling paints and that there was no proven link between mangrove deaths and diuron and that mangroves near sugar plantations on the Pioneer River were healthy.

Environment Australia's 2001 State of the Environment Report¹⁰ discussed pesticide contamination of inland surface- and ground water. Although there is currently no national monitoring of pesticides in Australian rivers, extensive monitoring programs of irrigation water are carried out in the NSW Riverina by irrigation companies. Diuron has been frequently detected in drainage water, although not usually at levels exceeding the

Guidelines for Fresh and Marine Water Quality for the protection of aquatic ecosystems set by the Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ). In monitoring programs conducted by the NSW Department of Land and Water Conservation, diuron has been detected with increasing frequency from 1991/1992 through to 1999/2000 in several river systems of northern New South Wales (*e.g.*, the Gwydir and Namoi).

Some information on the environmental impact of diuron was received from the Victorian Department of Natural Resources and Environment. One issue identified in 2000 was the carry-over of diuron residues at the level of 2 mg/kg (affecting asparagus) in soil from an application 3 years beforehand. A complaint was also received from Gippsland in 1993 regarding off-target pasture damage caused by a combination herbicide containing diuron, hexazinone and bromacil. Another complaint was received from southwest Victoria about surface movement to farmland from the application site at the base of power poles. Diuron was detected in drains in Gippsland as part of a water monitoring survey in 1994.

6 TOXICOLOGICAL ISSUES

The Therapeutic Goods Administration (TGA) has indicated concerns regarding two impurities of diuron: 3,3',4,4'-tetrachloroazobenzene and 3,3',4,4'-tetrachloroazoxybenzene. The concerns relate to potential carcinogenicity. The minimum compositional standard for active constituent diuron is given in the table below:

Minimum compositional standard for active constituent diuron

Chemical	Standard
Diuron	Minimum 950 g/kg
3,3',4,4'-tetrachloroazobenzene	Maximum 20 mg/kg
3,3',4,4'-tetrachloroazoxybenzene	Maximum 2 mg/kg

The maximum impurity levels for diuron were set in the 1960s, prior to the National Registration Scheme. TGA will assess the toxicology of the impurities and advise the NRA whether or not these levels are appropriate when considered against today's more modernised synthesis methods. The Food and Agriculture Organisation (FAO) of the United Nations does not specify maximum levels for 3,3',4,4'-tetrachloroazobenzene or 3,3',4,4'-tetrachloroazoxy benzene in the active constituent diuron.

Reproductive and development toxicological studies¹¹ of 3,3',4,4'-tetrachloroazobenzene (TCAB) and 3,3',4,4'-tetrachloroazoxybenzene (TCAOB) were conducted on rats and mice by the National Toxicology Program of the US National Institutes of Health. Findings indicated that both TCAB and TCAOB have toxicological effects similar to those of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) (decreased weight gain, thymic atrophy, increased liver weights, induction of hepatic cytochrome P₄₅₀1A). Studies were based on data indicating that TCAB and TCAOB are isosteric to TCDD and bind to the

same liver receptor sites in laboratory animals and the prediction that TCAB and TCAOB should have similar results to TCDD, which is a known mutagen, teratogen, hepatotoxin and chloracne-causing agent (causing acne-form dermatosis). However, the chemicals were assessed to be 2 to 6 orders of magnitude less potent than TCDD. In humans, TCAB and TCAOB have been known to cause chloracne (acne-form dermatosis) amongst workers in herbicide manufacturing plants¹².

7 INTERNATIONAL REGULATORY STATUS OF PRODUCTS CONTAINING DIURON

Diuron products are registered in many countries, including New Zealand, United States, Canada, Europe and the United Kingdom.

Diuron is to be reviewed in the second stage of the European Union (EU) review program that is considering all chemicals registered in the EU before 26 July 1993. The data submission for the second stage of the EU review closed on 30 April 2002. The review is to be conducted by the Danish agricultural chemical regulator.

As part of a review of all chemicals used in marine antifoulants, the UK Advisory Committee on Pesticides (ACP) took the decision to cancel the use of diuron in antifouling treatments at its September 2000 meeting, due to environmental and human health concerns. Concerns regarding human health were raised because the available exposure data showed an insufficient margin of safety when compared with the No Observable Adverse Effect Level (NOAEL).

The United States Environmental Protection Agency has scheduled a reregistration of diuron to be conducted in 2002 under the Federal Insecticides, Fungicides and Rodenticides Act, which requires review of chemicals registered before November 1984.

Following an incident where it was claimed that irrigation water contaminated by pesticides from railway tracks had caused crop damage, the German Railways (DB) stopped using diuron for weed control on railway lines in 1996. DB switched to glyphosate and experimented with alternative means of control such as superheated steam. The German federal parliament subsequently imposed a legal ban on the use of diuron on railways, due to high levels of diuron in groundwater.

8. NEXT STAGES

The review will now commence and will deal with the matters outlined in this scope document.

Interested parties are requested to provide data addressing the deficiencies in Section 3.1. Submissions must reach the NRA by no later than **20 February 2003**. Submissions can be sent either by e-mail to chemrev@nra.gov.au or by mail to:

Pesticides Review Manager
National Registration Authority
P.O. Box E240
KINGSTON ACT 2604
Telephone: (02) 6272 3213

8.1 Announcement of the review

The availability of this review scope document coincides with the NRA's public announcement of the review. Registrants will be formally notified of their obligations during the review.

8.2 Data assessment

Environment Australia and the Therapeutic Goods Administration will assess relevant data and information submitted to the review and will provide the NRA with advice consequent to these assessments.

Depending on the findings of these assessments, the review can result in one of three broad outcomes:

- The NRA is satisfied that active constituents and products containing diuron continue to meet the conditions to which registration or approval are currently subject and confirms the registration and approvals; or
- The NRA is satisfied that the conditions to which the registration or approval is currently subject can be varied in such a way that the requirements for continued registration or approval will be complied with, and varies the conditions of approval or registration; or
- The NRA is not satisfied that the conditions continue to be met and suspends or cancels the registration or approvals.

8.3 Consultation

From initiation of the review process through to the implementation of any new requirements for supply, use and labelling, the NRA will consult with relevant stakeholders and other interested parties. Prior to finalisation of its report, the NRA will seek comments from key stakeholders and the public on a draft report.

The draft summary along with proposed recommendations will be made available to the stakeholders and public through the NRA website or direct communication. A period of at least 8 weeks will be allowed for stakeholders and the public to make comment.

REFERENCES

1. *The Pesticide Manual* (2000). 12th edition, British Crop Protection Council.
2. Haynes, D., J. Muller, and S. Carter, (2000). Pesticide and herbicide residues in sediments and seagrasses from the Great Barrier Reef World Heritage Area and Queensland coast. *Marine Pollution Bulletin*, 41: 279-287.
3. Haynes, D., P. Ralph, J. Prange and B. Dennison, (2000). The impact of the herbicide diuron on photosynthesis in three species of tropical seagrass. *Marine Pollution Bulletin*, 41: 288-293
4. Duke, N. C., C. Roelfsema, D. Tracey and L. Godson, (2001). *Preliminary Investigation into Dieback of Mangroves in the Mackay Region: Initial Investigation into Possible Causes*. Mangrove Ecosystem Research & Marine Botany Group, Botany Department, The University of Queensland, Brisbane, Queensland. Report to the Queensland Fisheries Service, Northern Region and the Community of Mackay Region. (<http://www.dpi.qld.gov.au/fishweb/5756.html>)
5. Williams D., (2001). *Impacts of Terrestrial Run-off on the Great Barrier Reef World Heritage Area*, Co-operative Research Centre for the Great Barrier Reef World Heritage Area, Reef Research Centre, Australian Institute of Marine Science. (www.reef.crc.org.au)
6. Haynes, D., (ed) (2001). *Great Barrier Reef Water Quality: Current Issues*. Great Barrier Reef Marine Park Authority, Townsville, Queensland.
7. Rayment, G.E., (2002). *Water Quality Pressures and Status in Sugar Catchments (Exposure Draft)*. Co-operative Research Centre for Sustainable Sugar Production. Indooroopilly, Queensland.
8. World Wildlife Fund for Nature, (2001). *Clear?...or present danger? Great Barrier Reef Pollution Report Card*, WWF Great Barrier Reef Campaign. (www.gbr.wwf.org.au)
9. Marohasy, J. and G. Johns (2002). *WWF Says 'Jump!', Governments Ask 'How High?'* Institute of Public Administration's NGO Project.
10. Environment Australia (2001). *Australia State of the Environment Report 2001*. Independent report to the Commonwealth Minister for the Environment and Heritage, Department of Environment and Heritage, CSIRO publishing. (www.ea.gov.au/soe/2001/index.html).

11. Little, A.D., (1991). Executive Summary of Safety and Toxicity Information for 3,3',4,4'-tetrachloroazobenzene and 3,3',4,4'-tetrachloroazoxybenzene, *National Toxicology Program*, National Institutes of Health, United States of America. (www.ntp-server.niehs.nih.gov/)

12. Morse, D.L, E.L. Baker JR., R.D. Kimbrough and C.L. Wisseman III (1979). Propanil-chloracne and methomyl toxicity in workers of a pesticide manufacturing plant. *Clinical Toxicology*, 15: 13-21.

Appendix 1: Active constituent approval holders.

Approval number	Approval holder
44120	Bayer Cropscience Pty Ltd
44277	Nufarm Australia Ltd
44278	Bayer Cropscience Pty Ltd
44476	Griffin Corporation Australia Pty Ltd
44477	Griffin Corporation Australia Pty Ltd
44484	Makhteshim-Agan (Australia) Pty Ltd
44507	Ancom Australia Pty Ltd
44588	United Phosphorus Ltd
45535	Griffin Corporation Australia Pty Ltd
47275	Mastra Corporation Pty Ltd
52458	Artfern Pty Ltd
52556	Farmoz Pty Limited
52901	Rotam Australasia Pty Ltd
54623	Becot Pty Ltd T/AS Intrade Commodities
55233	4Farmers Pty Ltd

Appendix 2: Registered products containing diuron as the only active constituent.

Product No	Product name	Registrant
31682	Agspray Die-It 800 Wettable Powder Diuron Herbicide	Agspray Chemical Co. Pty Ltd
31685	Bayer Diuron 500 SC Liquid Herbicide	Bayer Cropscience Pty Ltd
31702	Nufarm Flowable Diuron Liquid Herbicide	Nufarm Australia Ltd
31704	Nufarm Diuron 800 Herbicide	Nufarm Australia Ltd
39201	Nufarm Diuron 900 DF Herbicide	Nufarm Australia Ltd
42075	Di-On 800W Herbicide	Makhteshim-Agan Pty Ltd
45177	Bayer Diuron 900 WG Herbicide	Bayer Cropscience Pty Ltd
45772	Diurex WG Herbicide	Crop Care Australasia Pty Ltd
46812	Farmoz Diuron 900 WDG Herbicide	Farmoz Pty Ltd
46853	Farmco Flowable Diuron Liquid Herbicide	Nufarm Australia Ltd
47142	Diurex 500 SC Herbicide	Makhteshim-Agan (Australia) Pty Ltd
47485	Dupont Karmex DF Herbicide	Dupont (Australia) Ltd
47661	Striker 500 SC Selective Herbicide by Sanonda	Sanonda (Australia) Pty Ltd
48052	Farmoz Diuron 800 Flowable Herbicide	Farmoz Pty Ltd
48974	Zee-Uron 800 WP Herbicide	United Phosphorus Ltd
49104	Summit Diuron Herbicide	Sumitomo Australia Ltd
49205	Flowable Herbicide Diurmax	Artfern Pty Ltd
49540	Zee-Uron 500 SC Herbicide	United Phosphorus Ltd
49541	Zee-Uron 900 WG Herbicide	United Phosphorus Ltd
50020	Generex Diuron 500SC Herbicide	Generex Australia Pty Ltd
50258	Dupont Diuron DF Herbicide	Dupont (Australia) Ltd
50481	Agcare Biotech Flowable Diuron 500 SC Herbicide	Agcare Biotech Pty Ltd
50658	Diurmax Granules 900 WDG Herbicide	Artfern Pty Ltd
51253	Country Diuron 500 Flowable Herbicide	A&C Rural Pty Ltd
51631	Dow Agrosciences Diuron 500 Flowable Herbicide	Griffin Corporation Australia Pty Ltd
51632	Dow Agrosciences Diuron 800 Flowable Herbicide	Griffin Corporation Australia Pty Ltd
51852	Griffin Diuron WG Herbicide	Griffin Corporation Australia Pty Ltd
51853	Griffin Diuron Flowable Herbicide	Griffin Corporation Australia Pty Ltd
52176	Farmoz Diuron 500 Flowable Herbicide	Farmoz Pty Ltd
52183	Pets Pond Algae Killer	Australian Pet Supplies Pty Ltd
52342	Chemag Diuron Liquid Herbicide	Chemag Pty Ltd
52532	Crop Care Diuron Flowable Herbicide	Crop Care Australasia Pty Ltd
52672	Sipcam Diuron 500 SC Herbicide	Sipcam Pacific Australia Pty Ltd
52930	Griffin Diuron 800 Flowable Herbicide	Griffin Corporation Australia Pty Ltd
52931	Griffin Diuron 500 Flowable Herbicide	Griffin Corporation Australia Pty Ltd
53042	Agcare Biotech Diuron 900DF Herbicide	Agcare Biotech Pty Ltd
53046	Smart Diuron 500 Flowable Liquid Herbicide	Agcare Biotech Pty Ltd
53684	Crop Care Diurgranz WG Herbicide	Crop Care Australasia Pty Ltd
53812	Chemag Diuron 900WG Herbicide	Chemag Pty Ltd
54352	Rotam Diuron 500SC Herbicide	Rotam Australasia Pty Ltd
54571	Pond Science Crystal Pond (Algaecide for Ornamental Ponds)	Universal Manufacturing & Laboratories Pty Ltd
54572	Aquarium Science Algae Clear (For Aquarium Use)	Universal Manufacturing & Laboratories Pty Ltd
55094	Country Diuron 900 WG Herbicide	A&C Rural Pty Ltd
55561	Conquest Diuron 900 WG Herbicide	Conquest Agrochemicals Pty Ltd
55612	Kenso Agcare Diuron 500 Herbicide	Kenso Corporation (M) SDN BHD
55703	Diurex 800 WG Herbicide	Makhteshim-Agan (Australia) Pty Ltd
56349	4 Farmers Diuron 500 SC Liquid Herbicide	4 Farmers Pty Ltd

Not to be used for commercial or registration purposes without the consent of the owner of the cited information.

Appendix 3: Registered products containing diuron and other active constituents.

Registered products containing diuron and cuprous oxide as active constituents

Product No	Product name	Registrant
40186	Wattyl Marine Coatings Sigmaplane Ecol Antifouling	Wattyl Australia Pty Ltd
45412	Interspeed Super BWA900 Bright Red	Akzo Nobel Pty Ltd
46919	Hempels Antifouling Mille Dynamic	Hempel's Marine Paints (Australia) Pty Ltd
46920	Hempels Antifouling Nautical	Hempel's Marine Paints (Australia) Pty Ltd
47587	International Interviron Super Antifouling Topcoat	Akzo Nobel Pty Ltd
47588	International Interviron Super Antifouling Basecoat	Akzo Nobel Pty Ltd
48970	Transocean Marine Paint Longlife Antifouling 2.77	Asian Paints (Qld) Pty Ltd
49606	International Epiglass Longlife High Strength Hard Antifouling	Akzo Nobel Pty Ltd
49609	International Epiglass VC Offshore Extra Polymer Reinforced Racing Antifouling	Akzo Nobel Pty Ltd
49611	International Epiglass Micron CSC High Strength Self Polishing Antifouling	Akzo Nobel Pty Ltd
49612	International Epiglass Coppercoat Ablative Antifouling	Akzo Nobel Pty Ltd
49687	Hempels Seatech Antifouling	Hempel's Marine Paints (Australia) Pty Ltd
49992	International Epiglass Coppercoat Extra Trade Antifouling	Akzo Nobel Pty Ltd
52241	Newport 88 Hard Racing Antifouling	Wattyl Australia Pty Ltd
52242	Wattyl Marine Coatings Sigmaplane Ecol HA 120 Antifouling	Wattyl Australia Pty Ltd
52243	Newport 77 Self-Polishing Copper Antifouling	Wattyl Australia Pty Ltd
53398	International Biolux New Technology Micron Extra High Strength Self Polishing Antifouling	Akzo Nobel Pty Ltd
54009	Wattyl Marine Coatings Trawler Antifouling	Wattyl Australia Pty Ltd

Registered products containing diuron and cuprous thiocyanate as active constituents

Product No	Product name	Registrant
46918	Hempels Antifouling Mille Dynamic Aluminium	Hempel's Marine Paints (Australia) Pty Ltd
49607	International Epiglass Interspeed 2000 Hard Antifouling for Aluminium	Akzo Nobel Pty Ltd
49608	International Epiglass Cruiser Superior Ablative Antifouling for Aluminium	Akzo Nobel Pty Ltd

Registered products containing diuron and hexazinone as active constituents

Product No	Product name	Registrant
45909	Dupont Velpar K4 DF Herbicide	Dupont (Australia) Ltd
51613	Dupont Comanche Herbicide	Dupont (Australia) Ltd
54182	Agricultural Product Services Diuron/Hexazinone DF Herbicide	Agricultural Product Services Pty Ltd
54183	Agricultural Product Services Diuron/Hexazinone WP Herbicide	Agricultural Product Services Pty Ltd
54358	Nufarm Stamina DF Herbicide	Nufarm Australia Ltd
54408	Farmoz Bobcat Combi Herbicide	Farmoz Pty Ltd
54662	APS Diuron/Hexazinone WG Herbicide	Agricultural Product Services Pty Ltd

Registered products containing diuron and bromacil as active constituents

Product No	Product name	Registrant
31253	Dupont Krovar DF Herbicide	Dupont (Australia) Ltd
45417	Macspred Kromac G Granular Herbicide	Macspred Pty Ltd
47764	Macspred Kromac Industrial Herbicide	Macspred Pty Ltd

Registered products containing diuron and other listed active constituents

Product No	Product name	Other active constituents	Registrant
31275	Agspray Kill-All Total Herbicide	2,2-DPA and amitrole	Agspray Chemical Co. Pty Ltd
45441	Macspred Dymac G Granular Herbicide	Hexazinone and bromacil	Macspred Pty Ltd
47242	Dropp Ultra Cotton Defoliant	Thidiazuron	Bayer Cropscience Pty Ltd
48712	Nomix G-D Ready-to-use, Non-selective Herbicide	Glyphosate as isopropylamine salt	Nuturf Pty Ltd
48843	Top Quality 40 South Marine Paint Atlantic Controlled Solubility Copolymer Antifouling	Cuprous thiocyanate and zinc oxide	Tasmanian Paints Pty Ltd
48969	Transocean Marine Paint Cleanship Antifouling 2.95	Chlorothalonil and cuprous oxide	Asian Paints (Qld) Pty Ltd

Appendix 4: Introduction to the NRA and the Chemical Review Program

The NRA

The National Registration Authority for Agricultural and Veterinary Chemicals (NRA) is an independent statutory authority responsible for regulation of agricultural and veterinary chemicals in Australia up to the point of retail sale under the National Registration Scheme. The States and Territories have responsibility for control of use of agricultural and veterinary chemicals.

The NRA operates under two key pieces of legislation. The first is the *Agricultural and Veterinary Chemicals (Administration) Act 1992*. This established the National Registration Scheme in 1993. It also set out the NRA's role as an independent statutory authority undertaking the Commonwealth's responsibilities under the Scheme and provides the NRA with its full range of powers. The *Agricultural and Veterinary Chemicals Code Act 1994* and the corresponding state legislation (the *Agvet Codes*) detail the operational provisions for registering chemical products.

The NRA's role in the Scheme is to assess the safety and efficacy of potential new agricultural and veterinary chemical products to ensure that they will not be harmful to people, animals, the environment or Australia's trade, and to ensure that they will be effective. The NRA regulates the supply of agricultural and veterinary chemicals to the Australian market through approval of active chemical constituents, registration of products and approval of product labels.

The NRA monitors agricultural and veterinary chemicals in the marketplace to ensure they are registered and conform to the standards set at registration.

As well as registering new agricultural and veterinary chemical products, the NRA reviews older chemicals and products to determine whether they meet contemporary standards for human health, occupational health and safety, efficacy and environmental impact. If necessary, the NRA will change the conditions of registration or withdraw the chemical from the market.

Reconsideration of Approvals and Registrations

The NRA reconsiders approvals and registrations when it appears that older chemicals may not continue to satisfy current safety standards and when instructions on product labels may no longer be adequate. A significant proportion of the agricultural and veterinary chemicals used in Australia were registered many years ago, sometimes as far back as the 1950s, under earlier arrangements of the States and Territories. Since those times, assessment methods and standards have changed as result of continuing research and experience. The uses of products and application techniques have evolved and in some cases, current use practice is different from the information on the approved labels. For some chemicals, new information from overseas regulatory agencies brings to light concerns about health or environmental issues.

Under Division 2 of Part 4 of the *Agvet Codes*, the NRA has the statutory power to reconsider the approvals of active constituents, the registrations of products and the approvals of associated product labels. The basis for initiating a reconsideration (review) is whether the NRA is satisfied that the requirements prescribed by the legislation for continued approval or registration are being met. The prescribed requirements are that the active constituent or product:

- should pose no undue hazard to the safety of people exposed to it during handling of the chemical or anything containing its residues; and
- would not be likely to have an effect that is harmful to human beings; and
- would not be likely to have an unintended effect that is harmful to animals, plants, things or the environment; and
- would not unduly prejudice trade or commerce between Australia and other countries; and
would be effective.

SCOPE DOCUMENT

Appendix 5: NRA Obligations Under the Legislation

Under section 31 of the Commonwealth Agricultural and Veterinary Chemicals Code Act 1994 and the corresponding State legislation (the Agvet Codes), the NRA is authorised to reconsider the registration of any agricultural or veterinary chemical product.

If the NRA proposes to reconsider the approval of an active constituent, the registration of a product or the approval of a label, the NRA is required under section 32(2) of the Agvet Codes to notify interested persons (approval holders or registrants) in writing of the proposed reconsideration. In such a notice the NRA is required to request the interested person to submit to the NRA any information of which the interested person is aware and which is relevant to the reconsideration. The NRA may also, under section 32(1) publish a notice of the reconsideration. Such a notice would usually be published in the NRA Gazette.

Once the reconsideration has been conducted, if the NRA is satisfied that continued use of the active constituent or product in accordance with NRA-approved recommendations for use would not be an undue hazard to the safety of people or be likely to have an effect that is harmful to people, animals, plants, things, the environment or Australia's trade, the NRA must, under section 34(1) of the Agvet Codes, notify the interested person in writing affirming the active approval or product registration. If a notice was published in the NRA Gazette under section 32(1) of the Agvet Codes, the NRA must publish a second notice stating that the active approval or product registration has been affirmed.

If the NRA is satisfied that the conditions of registration or approval can be varied so that continued use would not be an undue hazard to the safety of people or be likely to have an effect that is harmful to people, animals, plants, things, the environment or Australia's trade, the NRA must under sections 34(4) and 34(5) of the Agvet Codes vary the conditions of approval or registration and notify the interested person of its decision, giving reasons.

Under section 40 of the Agvet Codes, the NRA may cancel the approval of an active constituent or the registration of a product if it is not satisfied that the conditions of approval or registration can be varied so that continued use would not be an undue hazard to the safety of people or be likely to have an effect that is harmful to people, animals, plants, things, the environment or Australia's trade.

Under section 32(5) of the Agvet Codes, the NRA must take into account any submissions made in response to a notice in the NRA Gazette, or a letter to an interested person.

Under section 59 of the Agvet Codes, information submitted by a registrant or approval holder to the NRA under section 32(2) of the Codes becomes protected information and the NRA must not use the information to support the continued registration of another registrant's product(s) or another approval holder's active constituent(s) without the two parties notifying the NRA that they have agreed to the terms of compensation.

SCOPE DOCUMENT

SCOPE DOCUMENT

-

SCOPE DOCUMENT

SCOPE DOCUMENT