Australian Pesticides &
Veterinary Medicines Authority

The Reconsideration of Approvals and Registrations Relating to 2,4-D

REVIEW SCOPE DOCUMENT

June 2003

Australian Pesticides &
Veterinary Medicines Authority

Canberra
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This scope document for the review of 2,4-D is published by the Australian Pesticides and Veterinary Medicines Authority. For further information about this review or the Pesticides Review Program, contact:

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SUMMARY

The APVMA has initiated its reconsideration of the approvals of the active constituent 2,4-D, the registrations of products containing 2,4-D, and the approvals of associated labels. This document defines the scope of the matters of concern to the APVMA and outlines the kinds of information the APVMA requires to conduct a comprehensive scientific assessment of 2,4-D.

Approvals of the active constituent 2,4-D are being reconsidered because of toxicological concerns. Products containing 2,4-D and all associated labels are being reviewed because of environmental, toxicological and occupational health and safety concerns. The reconsiderations will be made after the APVMA 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 APVMA's review will be available for public comment late in 2004 or early in 2005.

The APVMA will review the following aspects of active constituent approvals, product registrations and label approvals for 2,4-D:

- Toxicology, including:
  - potential for carcinogenicity in humans which might pose an undue hazard to human health; and
  - potential for toxicological exposure to humans via the oral, inhalation and dermal routes.
- Occupational health and safety, including:
  - possible risks to workers health associated with short and intermediate term occupational exposure; and
  - potential for hazards to worker safety
- Residues (potentially):
  - if the Office of Chemical Safety (OCS) sets or modifies an Acute Reference Dose (ARfD) and/or Acceptable Daily Intake (ADI) for 2,4-D, then a dietary exposure assessment might be required.
- Environmental, including:
  - potential for contamination of waterways; and
  - potential hazard to non-target animals and plants
- The adequacy of instructions and warnings on product labels

1 INTRODUCTION

Section 31 of the Agvet codes authorises the APVMA to reconsider:
(a) the approval of an active constituent for a proposed or existing chemical product; or
(b) the registration of a chemical product; or
(c) the approval of a label for containers for a chemical product.

The APVMA has decided to reconsider the approvals of the active constituent 2,4-D, the registrations of products containing 2,4-D, and the approvals of associated labels, based on concerns related to toxicology, environment and occupational health and safety.

2 REASONS FOR REVIEW

2,4-D (2,4,-dichlorophenoxyacetic acid) is a phenoxy compound used as a post-emergence herbicide. In October 1994 the APVMA (then the NRA) invited the public to nominate active constituents, chemical products or labels for consideration for review. Of the 600 chemical nominations, 80 were prioritised for review, one of which was 2,4-D. 2,4-D was nominated for review by community groups, individual citizens and government agencies.

Government agencies nominated 2,4-D on the basis of concerns that it has high potential risk for chronic toxicity, claims of human birth defects, its potential as a possible carcinogen, large gaps in available data and international regulatory activity.

3 SCOPE OF THE REVIEW

The scope of the review has been defined taking into consideration the reasons for the nomination of 2,4-D, the information already available on this chemical and the way in which it is approved for use in Australia.

In light of concerns raised by:

- the Office of Chemical Safety (OCS), as detailed in Section 5; and
- National Occupational Health and Safety Commission (NOHSC) as detailed in Section 6, and
- Environment Australia (EA) as detailed in Section 8,

it appears that the APVMA might not be able to maintain its satisfaction that continued use of the active constituent 2,4-D and products containing 2,4-D in accordance with the recommendations for their use:

- would not be an undue hazard to the safety of people exposed to it during its handling; and/or
- would not be likely to have an effect that is harmful to human beings; and /or
- would not be likely have an unintended effect that is harmful to animals, plants or things or to the environment.

It also appears that the APVMA might not be able to maintain its satisfaction that labels for products containing 2,4-D contain adequate instructions.

On the basis of these concerns, it is appropriate that the registrations and approvals of 2,4-D be subject to reconsideration under Part 2, Division 4, of the Agvet Codes.

The APVMA will therefore review the following aspects of active constituent approvals, product registrations and label approvals for 2,4-D:

- Toxicology, including:
  - potential for carcinogenicity in humans which might pose an undue hazard to human health; and
  - potential for toxicological exposure to humans via the oral, inhalation and dermal routes.
- Occupational health and safety, including:
  - possible risks to workers health associated with short and intermediate term occupational exposure; and
  - potential for hazards to worker safety

- Residues (potentially):
  - if the OCS sets or modifies an Acute Reference Dose (ARfD) and/or Acceptable Daily Intake (ADI) for 2,4-D, then a dietary exposure assessment might be required.
- Environmental, including:
  - potential for contamination of waterways; and
  - potential hazard to non-target animals and plants
- The adequacy of instructions and warnings on product labels

Registrants and approval holders will be required to undertake certain actions aimed at securing relevant data that might address these matters. However, the public is invited to make submissions to the APVMA regarding any of the matters raised in the scope document (see Section 10).

4 REGULATORY STATUS AND USE PATTERNS OF 2,4-D IN AUSTRALIA

4.1 Active Constituents and Products

As at May 2003, there were 34 active constituent approvals for 2,4-D (Appendix 1), 118 registered products containing the active constituent 2,4-D and 31 registrants (Appendix 2). Of the registered products, 107 contain 2,4-D as the only active constituent, while the remaining 10 are combination products, containing at least one other active constituent (Appendix 3). 2,4-D can be formulated in salt (DMA, sodium, DEA, TIPA and IPA[1]) and ester (EH, IO and BEH[2]) forms. Formulation types include aqueous concentrates, dry flowables, emulsifiable concentrates, granular formulations, liquid concentrates, liquids, suspension concentrates, soluble concentrates, soluble powders and wettable powders.

4.2 Current use patterns

Products containing 2,4-D (a phenoxy herbicide) are used for post-emergent control of broadleaf and grass weeds in an extensive range of crops and non-cropping situations. Aerial, handheld and ground methods of application are used. Major agricultural uses of 2,4-D include pasture, stubble and fallow maintenance, cereal crops (including wheat, oats, barley, rye, triticale), grain crops (including sorghum, millet, maize) and oilseed crops (safflower, canola, rape). Other agricultural uses include cotton, citrus crops (particularly to inhibit post harvest abscission of buttons), sugar cane, sweetcorn, peanuts and control of banana suckers. 2,4-D is also used extensively for weed control in non-cropping situations, including commercial and industrial areas, turf, forestry and aquatic areas.

5 TOXICOLOGICAL ISSUES

Concerns have been raised by the OCS and international agencies in relation to the safety to humans of 2,4-D, based primarily on the potential for human birth defects, carcinogenicity in animals and the potential for chronic effects.

[1] DMA - dimethylamine, DEA - diethanolamine, TIPA - triisopropanolamine, IPA - isopropylamine
[2] EH – 2-ethylhexyl, IO – iso-octyl, BEH - butoxyethylhexl

Some studies have suggested a weak association between exposure to chlorophenoxy herbicides and non-Hodgkin's lymphoma and soft-tissue sarcoma. However, the results are inconsistent and most studies have not distinguished between exposure to 2,4-D and phenoxyacetic acid herbicides in general (Munro et al. 1992, FAO/WHO 1997, WHO 2003). For this reason, international regulatory bodies such as the United States Environmental Protection Agency (US EPA), the World Health Organisation (WHO) and the European Commission have concluded that available data are inadequate to establish a link between exposure to 2,4-D and non-Hodgkin's lymphoma. The US EPA has not classified 2,4-D as to its human carcinogenicity.

The Commonwealth Department of Health and Ageing (DoHA) conducted a review of 2,4-D in 1987 that concluded that there was no clear evidence that 2,4-D was immunotoxic. The DoHA also reviewed the genotoxicity of 2,4-D in 1989 and updated the review in 1993. The 1989 review concluded that although 2,4-D was not mutagenic in microbial test systems, it did affect cell division and DNA damage *in vitro*. The 1993 update observed an apparent effect on sperm morphology, motility and count in farm workers that had high concentrations of 2,4-D in their urine (2,4-D is rapidly and almost completely excreted by the body), but the evidence was not considered strong enough to make recommendations.

The Standing Committee on Toxicology (SCOT) - a committee of the National Health and Medical Research Council that has subsequently dissolved - reviewed existing papers on genotoxicity in 1993 and concluded that while it was noted that chromosomal changes had occurred at very high concentrations of 2,4-D, there was no association with mutation. SCOT also noted that epidemiological studies have suggested an association between 2,4-D and genotoxicity (e.g., Schop et al. 1990), however, comprehensive reviews of the literature did not provide sufficient biological evidence to support an association of increased risk of tumourogenicity with 2,4-D. SCOT did not review the effect of 2,4-D on reproduction.

A report of the World Health Organisation (WHO 1984) identified impurities arising from the synthesis and handling of 2,4-D active constituent that may have toxicological effects adverse to humans. 2,4-D is synthesised from the condensation of 2,4-dichlorophenol with monochloroacetic acid in an alkaline environment. During the manufacture of 2,4-D, higher reaction temperatures and a higher pH (more alkaline) increase the formation of polychlorinated dibenzo-p-dioxin by-products (WHO 1989). The International Agency for Research on Cancer (IRAC) reports the polychlorinated dibenzo-p-dioxin impurities of 2,4-D are "*not classifiable as to their carcinogenicity to humans*". In addition to dioxins, a European Commission Report on 2,4-D in 2001 implicated furans as an impurity of 2,4-D that may also have significant adverse toxicological effects.

Advice from the OCS indicates that dioxin accumulation within adipose tissue (connective tissue that functions as a major storage site for fat) is of high toxicological concern because of the association of dioxins with carcinogenesis. Moreover, the toxic trace impurity, N-nitrosamine, can also occur in amine formulations of 2,4-D when nitrite or nitrate is added as a corrosion inhibitor for containers. In plastic or epoxy-lined containers this impurity is apparently eliminated (because nitrates and nitrites are not added).

The current Minimum Compositional Standard (MCS) for 2,4-D and its analogues specifies the maximum acceptable content of 'free phenols' (to be expressed as 2,4-dichlorophenol) to be 3 g/kg. In 1993, the National Drugs and Poisons Schedule Committee considered specifying a maximum level of dioxin impurity for 2,4-D technical. Because dioxins in the active constituents considered to that date were below the limit of

quantification, a maximum level was not specified. Based on a review of the toxicology of these impurities, a revision of the MCS might be warranted as a related action.

The acute oral LD_{50} of 2,4-D in rats is in the order of 443-699 mg/kg bw (FAO/WHO 1997). The Guideline for the Standard for Uniform Scheduling of Drugs and Poisons specifies that an acute toxicity in the range of 2000-5000 mg/kg bw is classified as an S5 poison, while S6 are typically in the range of 50-2000 mg/kg bw. Given the current poison schedule of all 2,4-D compounds is S5, yet the acute toxicity of 2,4-D is consistent with that of S6 poisons (as specified in the guideline), a revision of the poisons schedule for 2,4-D might be warranted (see section 11).

Having regard to these matters, the APVMA is concerned that 2,4-D (active and products) might pose an undue hazard to human health. It is anticipated that a revised poisons schedule for 2,4-D will require review of current first aid instructions and hazard warning statements for product labels.

6 OCCUPATIONAL HEALTH AND SAFETY ISSUES

The adequacy and suitability of personal protective equipment (PPE), as specified in the safety directions and re-entry periods to ensure worker safety, have not been subject to evaluation within the current regulatory framework. It is also not known whether an appropriate risk assessment methodology was employed in deriving current safety directions. Further, a revised toxicological hazard assessment might cause a need to reassess the adequacy of existing safety directions. In addition, it is noted that a re-entry period has not been specified on some approved product labels.

Having regard to these matters the APVMA is concerned that continued use of 2,4-D (active and products) might present an undue hazard to workers and therefore proposes to assess whether current occupational health and safety instructions are adequate.

7 RESIDUES ISSUES

Although the APVMA does not hold specific residues concerns, if the OCS revises the Acceptable Daily Intake and/or establishes an Acute Reference Dose for 2,4-D, then a dietary assessment might be required.

8 ENVIRONMENTAL ISSUES

Concern has been raised by Environment Australia regarding potential harmful effects of 2,4-D on aquatic organisms and non-target native vegetation. 2,4-D is considered moderately toxic to fish and birds.

The 2,4-D ester has a higher acute toxicity in aquatic environments than the 2,4-D acid, particularly for fish species (European Commission 2001a). Although 2,4-D is generally rapidly biodegraded in water, the half-life in water can be over 120 days under anaerobic conditions (WHO 2003). The potential for 2,4-D to enter waterways in Australia has been demonstrated by detection of 2,4-D in water during CSIRO pesticide monitoring the south-western NSW irrigation area. Environment Australia has raised concerns regarding runoff.

In 2001, the European Commission (Commission Directive 2001/103/EC, 2001b) identified the protection of groundwater and non-target arthropods as issues that must be

considered by EU member states during decisions regarding authorisation of plant protection products containing 2,4-D.

Post-application vapour movement can and does occur with 2,4-D ester formulations, while spray drift can occur with both ester and amine formulations. This is of concern due the susceptibility of a number of crops, such as grape vines, to 2,4-D.

Additionally, the APVMA has not assessed the potential for off-target damage to native vegetation or animals. Having regard to these matters, the APVMA is concerned that continued use of products containing 2,4-D might have unintended effects that are harmful to animals, plants or things or to the environment.

9 INTERNATIONAL REGULATORY STATUS OF PRODUCTS CONTAINING 2,4-D

In recent years, comprehensive reviews of 2,4-D have been conducted internationally. Largely, the data have been generated by the Industry Task Force II of 2,4-D Research Data, an industry funded co-operative that was initially established to satisfy US regulatory requirements.

United States

The United States Environmental Protection Agency (US EPA) has considered 2,4-D for review under its Special Review Program. The consideration of 2,4-D for review related principally to concerns of carcinogenicity. 2,4-D was classified as Category D carcinogen (agents with inadequate human and animal evidence of carcinogenicity for which no data are available). Following an initial assessment, it was determined that the risk of carcinogenicity was lower than originally believed and therefore in 1998 the US EPA proposed to not initiate the Special Review.

In addition to the Special Review Program, the US EPA is considering the eligibility of all chemicals registered before November 1984, for re-registration under the Federal Insecticides, Fungicides and Rodenticides Act 1998. A decision on re-registration eligibility of 2,4-D has not yet been made because 2,4-D is ranked among the lowest priority group of pesticides products used in food production. It is expected that the re-registration eligibility of 2,4-D will be considered in the 2004 fiscal year (1 October 2003 – 30 September 2004).

UK

In 1993, the Pesticides Safety Directorate released a review report on 2,4-D and its salts and esters. It is evident from the report recommendations that significant gaps existed in the evaluated data. The report recommended additional data requirements, including toxicity/operator exposure, methods of analysis, physical properties, storage stability, monitoring of toxic impurities (dioxin), residues in food and crop metabolism, as well as studies on environmental fate and impacts on wildlife. Despite the deficiencies in the data, it was recommended that all approvals be allowed to continue while data requirements were generated and evaluated. Currently, the Pesticides Safety Directorate has national regulations that implement the directives and Maximum Residue Limits (MRL's) set by the European Commission in 2002.

Europe

2,4-D has been banned in Sweden and Norway, due to adverse health and environmental (Norway only) effects. The use of 2,4-D in Denmark has been restricted for environmental reasons.

The European Commission Standing Committee on Plant Health completed a re-evaluation of the active 2,4-D in October 2001. The effects of 2,4-D on mammalian toxicology, environment fate and behaviour, ecotoxicology and residues were assessed as a part of the re-evaluation process. The evaluation concluded that it may be expected that plant protection products containing 2,4-D will satisfy the safety requirements of the Council Directive. The commission concluded that residues arising from the proposed uses have no harmful effect on human or animal health and no unacceptable effects on the environment subject to conditions outlined in its re-evaluation. The review also identified several acceptable exposure scenarios for operators, workers and bystanders. The findings of the review are subject to the condition that active constituents are manufactured to a standard where the manufacturing impurities dioxins and furans are kept below detectable levels. In December 2002, the Commission of the European Communities set MRL's of 0.05 mg/kg in fruit and vegetables and 0.1 mg/kg in oil seeds, tea and hops (Commission Directive 2002/97/EC).

JMPR

The Joint WHO/FAO Meeting on Pesticides Residues (JMPR) conducted extensive reviews of 2,4-D in the 1970s, 1984, 1989 and more recently in 1996, 1997 and 1998. The 1996 review concluded that the toxicity of the salts and esters of 2,4-D was comparable to that of the acid. Accordingly, the ADI and NOEL reflected a combined exposure to the analogues. It also concluded that 2,4-D and its salts and esters do not appear to be genotoxic. The WHO concluded in 1998 that the intake of residues of 2,4-D resulting from the uses considered by JMPR is unlikely to present a public health concern in the long term. The 2000 JMPR meeting concluded that the intake of 2,4-D residues is unlikely to present a risk to consumers in the short-term.

Others

Extensive evaluations by the International Agency Research on Cancer (IARC) and WHO have been conducted, however the age of these studies pre-dates the last assessment conducted by DoHA/Standing Committee on Toxicology (SCOT) in Australia and modernised data developed by Industry Taskforce II on 2,4-D Research Data. Studies supplied by the Industry Taskforce II on 2,4-D Research Data through WHO concluded there was no evidence of carcinogenicity or genotoxicity associated with 2,4-D.

10 SUBMISSIONS FROM THE PUBLIC INVITED

Interested parties are requested to provide data addressing the issues raised in this scope document. These must reach the APVMA by no later than **1 October 2003**. Submissions can be sent either by email to chemrev@apvma.gov.au or by mail to:

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11 DATA ASSESSMENT AND POSSIBLE OUTCOMES

Environment Australia, the Office of Chemical Safety and the National Occupational Health and Safety Commission will conduct the technical assessment of data submitted for the review of 2,4-D. These agencies will advise the APVMA about the concerns raised in Sections 5, 6, 7 and 8.

The data might lead the agencies that provide expert advice to the APVMA to consider setting appropriate public health standards, which in this case might involve:

- the OCS revising the Acceptable Daily Intake (ADI);
- the OCS establishing an Acute Reference Dose (ARfD);
- the NHMRC revising the drinking water standard;
- the NDPSC revising the existing poisons schedule;
- the APVMA revising or establishing Maximum Residue Limits (MRLs).

The APVMA will have regard to the appropriate public health standards in its reconsideration of approvals and registrations.

Depending on the findings of the technical assessment, a review can result in one of three broad outcomes:

- the APVMA is satisfied that active constituents and products containing 2,4-D continue to meet the conditions to which registration or approval are currently subject and confirms the registration and approvals; or
- the APVMA 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 APVMA is not satisfied that the conditions continue to be met and suspends or cancels the registration or approvals.

12 CONSULTATION THROUGHOUT THE REVIEW PROCESS

From initiation of the review through to the implementation of the review outcomes, the APVMA will consult with relevant stakeholders and interested parties. Prior to finalisation of any report, comments from key stakeholders and the public will be sought.

The draft of the review summary along with proposed recommendations is intended to be made available to the stakeholders and public through the APVMA website or direct communication. A period will be allowed for the stakeholders and the public to comment on the draft.

REFERENCES

European Commission (2001a). Review report for the active substance 2,4-D. Health and Consumer Protection Directorate – General, Directorate E1 – Plant Health.

European Commission (2001b). Commission Directive 2001/103/EC of 28 November 2001, amending Annex 1 to Council Directive 91/414/EEC concerning the placing of plant protection products on the market to include 2,4-dichlorophenoxy acetic acid (2,4-D) as an active substance. The Commission of the European Communities.

European Commission (2002). Commission Directive 2002/97/EC of 16 December 2002. amending the Annexes to Council Directives 86/362/EEC, 86/363/EEC and 90/642/EEC as regards the fixing of maximum levels for pesticide residues (2,4-D, triasulfuron and thifensulfuron methyl) in and on cereals, foodstuffs of animal origin and certain products of plant origin, including fruit and vegetables. The Commission of the European Communities.

FAO/WHO (1997). Pesticide residues in food – 1996 Joint FAO/WHO Meeting on Pesticide Residues. Evaluations 1996. Geneva, World Health Organisation, International Programme on Chemical safety.

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Schop, R. N., Hardy, M. H. and Goldberg, M. T. (1990). Comparison of the activity of topically applied pesticides and the herbicide 2,4-D in two short-term *in vivo* assays of genotoxicity in the mouse. Fundam. Appl. Toxicol. 15: 666-675.

APPENDIX 1 – Active constituent approvals for 2,4-D.

Approval number	Active constituent	Registrant
51006	2,4-D	A H MARKS AUSTRALIA PTY LTD
51007	2,4-D-ISOBUTYL ESTER	A H MARKS AUSTRALIA PTY LTD
54018	2,4-D-2-ETHYLHEXYL ESTER	A H MARKS AUSTRALIA PTY LTD
47430	2,4-D	ANCOM AUSTRALIA PTY LTD
47486	2,4-D-ISOBUTYL ESTER	ANCOM AUSTRALIA PTY LTD
52797	2,4-D-2-ETHYLHEXYL ESTER	BINARY CHEMICALS PTY LTD
52798	2,4-D-ISOBUTYL ESTER	BINARY CHEMICALS PTY LTD
47158	2,4-D	DOW AGROSCIENCES AUSTRALIA LIMITED
47548	2,4-D	DOW AGROSCIENCES AUSTRALIA LIMITED
47549	2,4-D-BUTYL ESTER	DOW AGROSCIENCES AUSTRALIA LIMITED
47550	2,4-D	DOW AGROSCIENCES AUSTRALIA LIMITED
47551	2,4-D 2-BUTOXYETHYL ESTER	DOW AGROSCIENCES AUSTRALIA LIMITED
47552	2,4-D-2-ETHYLHEXYL ESTER	DOW AGROSCIENCES AUSTRALIA LIMITED
48691	2,4-D	FARMOZ PTY LIMITED
51416	2,4-D	FARMOZ PTY LIMITED
52405	2,4-D	HALLEY INTERNATIONAL ENTERPRISE (AUSTRALIA) PTY LTD
44088	2,4-D-2-ETHYLHEXYL ESTER	NUFARM AUSTRALIA LIMITED
44089	2,4-D	NUFARM AUSTRALIA LIMITED
44245	2,4-D	NUFARM AUSTRALIA LIMITED
44393	2,4-D	NUFARM AUSTRALIA LIMITED
44483	2,4-D-SODIUM	NUFARM AUSTRALIA LIMITED
46746	2,4-D-2-ETHYLHEXYL ESTER	NUFARM AUSTRALIA LIMITED
47187	2,4-D-ISOBUTYL ESTER	NUFARM AUSTRALIA LIMITED
47188	2,4-D-N-BUTYL ESTER	NUFARM AUSTRALIA LIMITED
47189	2,4-D-ETHYL ESTER	NUFARM AUSTRALIA LIMITED
47190	2,4-D-2-ETHYLHEXYL ESTER	NUFARM AUSTRALIA LIMITED
48602	2,4-D	NUFARM AUSTRALIA LIMITED

Approval number	Active constituent	Registrant
51903	2,4-D-ETHYL ESTER	NUFARM AUSTRALIA LIMITED
52707	2,4-D ISOPROPYLAMINE SALT	NUFARM AUSTRALIA LIMITED
52708	2,4-D DIMETHYLAMINE SALT	NUFARM AUSTRALIA LIMITED
44074	2,4-D	ROTAM AUSTRALASIA PTY LTD
51653	2,4-D-ETHYL ESTER	ROTAM AUSTRALASIA PTY LTD
52286	2,4-D-ISOBUTYL ESTER	ROTAM AUSTRALASIA PTY LTD
47160	2,4-D	SANONDA (AUSTRALIA) PTY LTD

APPENDIX 2 - Products containing 2,4-D and their respective registrants

Product Number	Product Name	Registrant	Label Approval Number(s)
50629	4FARMERS 2,4-D AMINE 500 HERBICIDE	4FARMERS PTY LTD	50629/0698
52591	4FARMERS 2,4-D ESTER 800 HERBICIDE	4FARMERS PTY LTD	52591/0300
55195	COUNTRY 2,4-D 300 HERBICIDE	A & C RURAL PTY LTD	55195/0402
50637	COUNTRY 2,4-D AMINE 500 SELECTIVE HERBICIDE	A & C RURAL PTY LTD	50637/0302 50637/0798
51468	COUNTRY 2,4-D LOW ODOUR 500 SELECTIVE HERBICIDE	A & C RURAL PTY LTD	51468/0302 51468/0399
51925	COUNTRY 225 AMINE HERBICIDE	A & C RURAL PTY LTD	51925/0302 51925/0899
55427	COUNTRY AMINE 625 SELECTIVE HERBICIDE	A & C RURAL PTY LTD	55427/0802
52924	COUNTRY ESTER 800 SELECTIVE HERBICIDE	A & C RURAL PTY LTD	52924/0302 52924/0500
53619	HERBOXONE 500 HERBICIDE	A H MARKS AUSTRALIA PTY LTD	53619/0301
55923	HERBOXONE LV 600 HERBICIDE	A H MARKS AUSTRALIA PTY LTD	55923/0802
54655	SEKIRA HERBICIDE	A H MARKS AUSTRALIA PTY LTD	54655/1201
52568	AGCARE BIOTECH 2,4-D AMINE 500 HERBICIDE	AGCARE BIOTECH PTY LTD	52568/1299

Product Number	Product Name	Registrant	Label Approval Number(s)
52569	AGCARE BIOTECH 2,4-D ESTER 800 HERBICIDE	AGCARE BIOTECH PTY LTD	52569/1299
52635	SMART 2,4-D AMINE 500 HERBICIDE	AGCARE BIOTECH PTY LTD	52635/0200
52634	SMART 2,4-D ESTER 800 HERBICIDE	AGCARE BIOTECH PTY LTD	52634/0200
56463	HORIZON 500 HERBICIDE	AGONOMICS PTY LTD	56463/1002
56462	RESPECT 300 HERBICIDE	AGONOMICS PTY LTD	56462/1002
56510	AGRICROP AFFRAY 300 HERBICIDE	AGRICROP PTY LTD	56510/1002
56405	AGRICROP RUBBER VINE SPRAY HERBICIDE	AGRICROP PTY LTD	56405/0902
39862	YATES LAWN WEEDER & FEEDER	ARTHUR YATES & CO LIMITED	Ψ
42091	ACTRIL DS SELECTIVE HERBICIDE	BAYER CROPSCIENCE PTY LTD	42091/02 42091/03 42091/0403 42091/0997
51110	CHEMAG ESTER 800 HERBICIDE	CHEMAG PTY LTD	51110/0998
53817	CHEMAG LV ESTER 600 HERBICIDE	CHEMAG PTY LTD	53817/0601
51111	SMASH 225 HERBICIDE	CHEMAG PTY LTD	51111/0998
53721	SMASH 300 SELECTIVE HERBICIDE	CHEMAG PTY LTD	53721/0301
53722	SMASH 500 LOW ODOUR SELECTIVE HERBICIDE	CHEMAG PTY LTD	53722/0301
51136	SMASH 500 SELECTIVE HERBICIDE	CHEMAG PTY LTD	51136/0898
56414	SMASH 625 SELECTIVE HERBICIDE	CHEMAG PTY LTD	56414/0902
31536	CAMPBELL METHAR TRI-KOMBI HERBICIDE	COLIN CAMPBELL (CHEMICALS) PTY LTD	31536/02
31537	CAMPBELL TRI-KOMBI LAWN WEEDER	COLIN CAMPBELL (CHEMICALS) PTY LTD	31537/0403
55701	CONQUEST AMINE 300 SELECTIVE HERBICIDE	CONQUEST AGROCHEMICALS PTY LTD	55701/0602
55702	CONQUEST AMINE 625 SELECTIVE HERBICIDE	CONQUEST AGROCHEMICALS PTY LTD	55702/0602
54925	CONQUEST ESTER 800 SELECTIVE HERBICIDE	CONQUEST AGROCHEMICALS PTY LTD	54925/0102 54925/0302
54153	CROP CARE 2, 4-D ESTER 800 HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	54153/0701
52557	CROP CARE 2,4-D AMINE 500 HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	52557/1002 52557/1299
52559	CROP CARE 2,4-D ISO HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	52559/0200
56763	CROP CARE AMINE 625 SELECTIVE HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	56763/0203
56764	CROP CARE ESTER 800 SELECTIVE HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	56764/0203

Product Number	Product Name	Registrant	Label Approval Number(s)
52977	CROP CARE LOW ODOUR 2,4-D AMINE 500 HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	52977/0500
54518	CROP CARE LOW ODOUR 2,4-D AMINE 500 HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	54518/0901
56905	ZEPHYR 2,4-D LOW ODOUR HERBICIDE	CROP CARE AUSTRALASIA PTY LTD	56905/0403
40487	TORDON 75-D HERBICIDE	DOW AGROSCIENCES AUSTRALIA LIMITED	40487/0798 40487/0997
53292	ECHEM 2,4-D AMINE 500 HERBICIDE	ECHEM (AUST) PTY LTD	53292/0800
53293	ECHEM 2,4-D ISOPROPYLAMINE 225 HERBICIDE	ECHEM (AUST) PTY LTD	53293/0900
40571	FARMOZ 2,4-D AMINE 500 SELECTIVE WEEDKILLER	FARMOZ PTY LIMITED	40571/0701
55046	FARMOZ 2,4-D AMINE 625 SELECTIVE HERBICIDE	FARMOZ PTY LIMITED	55046/1201
40234	FARMOZ 2,4-D ESTER 800 HERBICIDE	FARMOZ PTY LIMITED	40234/0701
55029	FARMOZ ZULU 300 HERBICIDE	FARMOZ PTY LIMITED	55029/1201
50779	FARMOZ ZULU HERBICIDE	FARMOZ PTY LIMITED	50779/0898
49671	GENEREX 2,4-D AMINE 500 L HERBICIDE	GENEREX AUSTRALIA PTY LTD	49671/01
49673	GENEREX 2,4-D ESTER 800 L HERBICIDE	GENEREX AUSTRALIA PTY LTD	49673/01
56266	GENEREX GLYMATE 300 HERBICIDE	GENEREX AUSTRALIA PTY LTD	56266/0802
50206	GENEREX GLYMATE HERBICIDE	GENEREX AUSTRALIA PTY LTD	50206/0298 50206/1197
55532	CHOICE LOWODOUR AMINE 500 HERBICIDE	GROW CHOICE PTY LIMITED	55532/0302
53169	DISTRIBUTION 2,4-D ESTER 800 HERBICIDE	GROW CHOICE PTY LIMITED	53169/0600
54603	MATE 300 HERBICIDE	GROW CHOICE PTY LIMITED	54603/0901
54529	HALLEY 2,4-D AMINE 500 LOW ODOUR HERBICIDE	HALLEY INTERNATIONAL ENTERPRISE (AUSTRALIA) PTY LTD	54529/0801
54595	HALLEY 2,4-D ESTER 800 HERBICIDE	HALLEY INTERNATIONAL ENTERPRISE (AUSTRALIA) PTY LTD	54595/0901
54528	HALLEY 2,4-D IPA 300 HERBICIDE	HALLEY INTERNATIONAL ENTERPRISE (AUSTRALIA) PTY LTD	54528/0801
54813	HALLEY LV ESTER 600 HERBICIDE	HALLEY INTERNATIONAL ENTERPRISE (AUSTRALIA) PTY LTD	54813/1001
33330	KENDON COMMERCIAL CITRUS STOP DROP	KENDON CHEMICALS & MNFG CO PTY LTD	33330/02 33330/0999
49335	KENDON WILLIAM PEAR STOP DROP	KENDON CHEMICALS & MNFG CO PTY LTD	49335/1198
53970	KEN-AMINE 500 SELECTIVE HERBICIDE	KENSO CORPORATION (M) SDN BHD	53970/0102 53970/0301
56339	KENSO AGCARE KEN-AMINE 625 SELECTIVE HERBICIDE	KENSO CORPORATION (M) SDN BHD	56339/1002
54954	KENSO AGCARE KEN-ESTER 800 HERBICIDE	KENSO CORPORATION (M) SDN BHD	54954/1201

Product Number	Product Name	Registrant	Label Approval Number(s)
54950	KENSO AGCARE KEN-STAR 300 HERBICIDE	KENSO CORPORATION (M) SDN BHD	54950/0102
50471	AMINE 500 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	50471/0402 50471/0498 50471/0700 50471/1000
51834	ARTFERN 2,4-D AMINE 500 LOW ODOUR SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	51834/0402 51834/0599
51835	ARTFERN AMINE 225 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	51835/0402 51835/0899
55292	ARTFERN AMINE 300 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	55292/0102 55292/0802
55293	ARTFERN AMINE 625 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	55293/0102
46314	BATON HERBICIDE	NUFARM AUSTRALIA LIMITED	46314/01 46314/0902 46314/1297
52464	DAVISON 2,4-D AMINE 720 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	52464/0500
53923	DAVISON NEMESIS 300 HERBICIDE	NUFARM AUSTRALIA LIMITED	53923/0401
50475	ESTER 800 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	50475/0202 50475/0398 50475/0400
31185	FARMCO D-500 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	Ψ
31207	FARMCO D-800 SELECTIVE WEEDKILLER	NUFARM AUSTRALIA LIMITED	Ψ
48160	NUFARM 2,4-D 720 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	48160/01
41486	NUFARM AF RUBBER VINE SPRAY	NUFARM AUSTRALIA LIMITED	41486/0298
41487	NUFARM AF-300 HERBICIDE	NUFARM AUSTRALIA LIMITED	41487/01 41487/0902
31186	NUFARM AMICIDE 500 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	31186//02 31186/02 31186/0200 31186/0298 31186/0500

Product Number	Product Name	Registrant	Label Approval Number(s)
52904	NUFARM AMICIDE 625 SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	52904/0800 52904/0902
56179	NUFARM AMICIDE 625-LOW SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	56179/1002
31638	NUFARM AMICIDE LO-500A SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	31638/02 31638/03 31638/0498 31638/0902
31209	NUFARM ESTERCIDE 800 HERBICIDE	NUFARM AUSTRALIA LIMITED	31209/01 31209/0498 31209/0902 31209/0998 31209/1197
31213	NUFARM LOW VOLATILE ESTER 400 HERBICIDE	NUFARM AUSTRALIA LIMITED	31213/0700
42229	NUFARM LV ESTERCIDE 600 HERBICIDE	NUFARM AUSTRALIA LIMITED	42229/0101 42229/0902 42229/1199 42229/1201
50489	NUFARM NUTRIL SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	50489/0998
41496	NUFARM SODIUM 2,4-D SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED	Ψ
52999	NUFARM SURPASS 300 HERBICIDE	NUFARM AUSTRALIA LIMITED	52999/0800 52999/0902
54316	NUFARM SURPASS 450 HERBICIDE	NUFARM AUSTRALIA LIMITED	54316/0802
45510	NUFARM SURPASS HERBICIDE	NUFARM AUSTRALIA LIMITED	45510/01 45510/0298 45510/0898
31262	NUFARM TILLMASTER HERBICIDE	NUFARM AUSTRALIA LIMITED	31262/1097
45724	TORNADO DF HERBICIDE	NUFARM AUSTRALIA LIMITED	45724/0698
55236	NUTURF MILLENNIUM HERBICIDE	NUTURF PTY LTD	55236/0303
56719	QM 2,4-D 625 SELECTIVE HERBICIDE	QUADRON MANUFACTURING PTY LTD	56719/0203
50380	QUANTUM 2,4-D AMINE 500 HERBICIDE	QUANTUM RURAL PTY LTD	50380/0698
55079	WSD 2,4-D ESTER 800 HERBICIDE	REBOP HOLDINGS PTY LTD T/AS WESTERN STOCK DISTRIBUTORS	55079/1201

Product Number	Product Name	Registrant	Label Approval Number(s)
56895	ROTAM 2,4-D ESTER 800 HERBICIDE	ROTAM AUSTRALASIA PTY LTD	56895/0403
52754	ROTAM RODAMINE 225 2,4-D HERBICIDE	ROTAM AUSTRALASIA PTY LTD	52754/0300
57087	ROTAM RODAMINE 300 2,4-D HERBICIDE	ROTAM AUSTRALASIA PTY LTD	57087/0503
52756	ROTAM RODAMINE 500 2,4-D AMINE HERBICIDE	ROTAM AUSTRALASIA PTY LTD	52756/0200
55930	2,4-D ESTER 800 HERBICIDE BY SANONDA	SANONDA (AUSTRALIA) PTY LTD	55930/0802
47128	AMINOZ 500 SELECTIVE WEEDKILLER BY SANONDA	SANONDA (AUSTRALIA) PTY LTD	47128/0403
50602	AMINOZ CT 225 HERBICIDE BY SANONDA	SANONDA (AUSTRALIA) PTY LTD	50602/0698
49751	FERTILISER 21:1:16 WITH DICOT WEED CONTROL III	SCOTTS AUSTRALIA PTY LTD	49751/0499
55855	OSMOCOTE LAWN BUILDER WITH WEED KILL	SCOTTS AUSTRALIA PTY LTD	55855/0203 55855/0403 55855/0602
49752	SCOTTS LAWN BUILDER WITH WEED KILL	SCOTTS AUSTRALIA PTY LTD	49752/0499
56814	SIPCAM AMINE 625 SELECTIVE HERBICIDE	SIPCAM PACIFIC AUSTRALIA PTY LTD	56814/0203
51850	SIPCAM AMIZINA 225 HERBICIDE	SIPCAM PACIFIC AUSTRALIA PTY LTD	51850/0100
51751	SIPCAM AMIZINA 500 SELECTIVE HERBICIDE	SIPCAM PACIFIC AUSTRALIA PTY LTD	51751/0399
51752	SIPCAM AMIZINA LOW ODOUR 500 SELECTIVE HERBICIDE	SIPCAM PACIFIC AUSTRALIA PTY LTD	51752/0399
52322	SIPCAM SIESTER 800 HERBICIDE	SIPCAM PACIFIC AUSTRALIA PTY LTD	52322/0103 52322/0200
49103	SUMMIT 2,4-D AMINE 500 SELECTIVE HERBICIDE	SUMITOMO AUSTRALIA LTD	49103/01 49103/0201 49103/0302 49103/0403
53287	SUMMIT COMPLEMENT HERBICIDE	SUMITOMO AUSTRALIA LTD	53287/0201 53287/0403 53287/1000
51815	SUMMIT SUM-ESTER 800 L HERBICIDE	SUMITOMO AUSTRALIA LTD	51815/0102 51815/0699 51815/1202
55601	UNITED FARMERS 2,4-D AMINE 625 SELECTIVE WEEDKILLER	UNITED FARMERS COOPERATIVE COMPANY LTD	55601/0303 55601/0502

Product Number	Product Name	Registrant	Label Approval Number(s)
53699	UNITED FARMERS ESTER 800 HERBICIDE	UNITED FARMERS COOPERATIVE COMPANY LTD	53699/0301 53699/0503

Ψ Labels transitioned from the States and so not having an approval number

APPENDIX 3 – Products containing 2,4-D and another active constituent

Product Number	Active Constituent in Combination with 2,4-D	Product Name	Registrant
42091	IOXYNIL PRESENT AS IOXYNIL OCTANOATE	ACTRIL DS SELECTIVE HERBICIDE	BAYER CROPSCIENCE PTY LTD
31536	DICAMBA DIMETHYLAMINE SALT MECOPROP AS THE DIMETHYLAMINE SALT	CAMPBELL METHAR TRI-KOMBI HERBICIDE	COLIN CAMPBELL (CHEMICALS) PTY LTD
31537	DICAMBA PRESENT AS THE DIMETHYLAMINE SALT MECOPROP AS THE DIMETHYLAMINE SALT	CAMPBELL TRI-KOMBI LAWN WEEDER	COLIN CAMPBELL (CHEMICALS) PTY LTD
40487	PICLORAM AS THE TRIISOPROPANOLAMINE SALT	TORDON 75-D HERBICIDE	DOW AGROSCIENCES AUSTRALIA LIMITED
31262	GLYPHOSATE PRESENT AS THE ISOPROPYLAMINE SALT	NUFARM TILLMASTER HERBICIDE	NUFARM AUSTRALIA LIMITED
50489	IOXYNIL PRESENT AS IOXYNIL OCTANOATE	NUFARM NUTRIL SELECTIVE HERBICIDE	NUFARM AUSTRALIA LIMITED
55236	CLOPYRALID PRESENT AS THE MONOETHANOLAMINE SALT DICAMBA PRESENT AS THE DIETHANOLAMINE SALT	NUTURF MILLENNIUM HERBICIDE	NUTURF PTY LTD
49751	DICAMBA MECOPROP	FERTILISER 21:1:16 WITH DICOT WEED CONTROL III	SCOTTS AUSTRALIA PTY LTD
49752	DICAMBA MECOPROP	SCOTTS LAWN BUILDER WITH WEED KILL	SCOTTS AUSTRALIA PTY LTD
55855	DICAMBA MECOPROP	OSMOCOTE LAWN BUILDER WITH WEED KILL	SCOTTS AUSTRALIA PTY LTD