# Westralia.Net's


# DERBY DIOXIN REPORT

## Analysis based on:

## EVALUATING THE EXPOSURE OF FORMER AGRICULTURE PROTECTION BOARD SPRAY WORKERS TO DIOXINS IN THE HERBICIDE 2,4,5-T

**Report of a Project**
**for the Western Australian Department Of Health**
**as part of**
**The Kimberley Chemical Use Review**

**DOUG INGRAHAM**
**CHEMISTRY CENTRE (WA)**

August 2003

With Extracts from Occupational Health Physician Professor Andrew Harper's

## KIMBERLEY CHEMICAL USE REVIEW

June 2002

Westralia.Net have utilised the Ingraham Report which was a background paper for the Armstrong Review, that was a review of the Harper Report, that reviewed the Kimberley Chemical Use, to investigate the longstanding 20 year claims of injury and death caused by exposure to chemical supplied to workers of the WA Agricultural Protection Board (APB).

## INTRODUCTION

Westralia.Net considers the Ingraham Report and The Harper Report as the only investigations relevant to the former workers' claims of exposure to unregulated dioxin during their employment with the APB. Other sections of the Armstrong Review focused on effects of standard 245T herbicide and subsequently have been utilised by the WA government to justify their finding that there is no evidence to support the use of unregulated dioxins.

The Armstrong Review was completed without any interviews with affected workers or requests for their medical records. Nor were eyewitness accounts of operational and supply procedures relating to the material in question investigated. Although there is no shortage of this valuable relevant information in the public domain, the government's terms of reference and operational decisions of the Armstrong Review Panel excluded scope to include the relevant material.

The Harper Report interviewed former workers and APB staff and reviewed medical records. The Ingraham Report investigated the material existence and source of 245T products. Although the investigation was not able to discover documentary evidence of unregulated dioxin being supplied to the APB, the report has highlighted that material was manufactured with consistent physical characteristics as the substance used by the Kimberley APB workers.

**Westralia.Net's Derby Dioxin Report publicly establishes the link between the Ingraham Report's material evidence supporting the workers' claims of exposure to unregulated dioxins. This is not a new revelation. There is no new material contained in this report.**

**However in contrast to the WA government's conclusions that there is no evidence to support the claims of unregulated dioxins being supplied to their employees, Westralia.Net demonstrates the contrary. There is in fact every reason to believe that illegal toxic waste was supplied to our citizens, and the evidence is easily available to prove so. Westralia.Net believes the WA government and Minister for Agriculture has selectively omitted relevant facts in publicising the reasons for achieving a conclusion that protects the government's interest.**
**This leaves the poisoned workers and their families to suffer and die with no closure, knowing full well people who purport to be protecting their welfare have shafted them to death.**

This report uses **HIGHLIGHTING** to sections of the Ingraham Report that indicate the existence of chemical NOT being standard 245T, being so far out of specification that it is in fact Toxic Waste. The **highlighting** is used throughout this report to demonstrate that contrary to the WA governments insistence that no evidence exists to support the workers claims of unregulated dioxin, there is a consistency and continuity of evidence readily available.
This exercise demonstrates that the workers claims are well founded. This is also evidenced by their numerous health symptoms and **personal accounts** of occupational procedures as recounted in the Harper Report.

# EVALUATING THE EXPOSURE OF FORMER AGRICULTURE PROTECTION BOARD SPRAY WORKERS TO DIOXINS IN THE HERBICIDE 2,4,5-T

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## EXECUTIVE SUMMARY

This investigation into the possible exposure of Agriculture Protection Board (APB) workers to dioxins in herbicides was conducted for the Western Australian Department of Health. The project was confined to one dioxin, 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD), in commercial derivatives of the herbicide 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). The project was developed following release in 2002 of the Kimberley Chemical Use Review report (the Harper report) on the use of phenoxy herbicides by APB workers during the period 1975 – 1985. One

of the conclusions in the Harper report was that “exposure to unregulated levels of dioxin cannot be ruled out”. The expert medical panel assembled to investigate the conclusions and recommendations of the Harper report required more information on dioxin levels in the products used by APB workers.

The main function of this investigation was to examine available evidence about the levels of dioxin contaminant in the products used by APB workers during the period 1975 - 1985. Information examined during the investigation came mainly from files of key government agencies including the Department of Agriculture, the Agriculture Protection Board, the Department of Health and the Chemistry Centre (WA).

The investigation has revealed that the herbicide products used by the APB during the relevant period were acquired through the normal Western Australian State Tender Board purchasing system. Much of the 2,4,5-T product used by the APB was manufactured by the company CIK Australia Pty Ltd (CIK) operating at Kwinana. Testing of 2,4,5-T products for dioxin levels was regular during the relevant period. Overall, very good compliance with regulatory limits for dioxin was observed, both for CIK products and for supplies from other manufacturers.

One matter researched in detail was the alleged existence of a “rogue batch” of 2,4,5-T with high dioxin content which was rumoured to have been used by APB workers sometime in the relevant period. Two separate issues were discovered. One concerned a faulty batch of 2,4,5-T manufactured by CIK around 1980 with dioxin content above the maximum permissible level. This entire batch went to two customers in New South Wales and most of the product was recalled before use and re-processed successfully. None was used in Western Australia by the APB.

**Evidence was also discovered concerning importation into Western Australia around April 1971 of about ten tonnes of a batch of a fire-damaged chemical used in 2,4,5-T manufacture which may have been contaminated with high levels of dioxin. No evidence of the composition of this material (based on analysis) has been found. Available information also indicated that unsuccessful attempts were made in Australia to convert this material into saleable commercial products. One sample of a derivative from the allegedly fire-damaged material has been analysed at the Chemistry Centre (WA) in 1981 and was found to contain levels of dioxin well above regulatory limits applicable at the time. The importer (CIK) documented plans to dispose of this material early in 1972. No information has been found as to the eventual fate of this material.**

In summary, no evidence of use by APB workers of 2,4,5-T products containing higher than regulated levels of dioxins has been found in this investigation. It is possible that a batch of allegedly fire damaged chemical used in 2,4,5-T manufacture may have been used or disposed of in some way within Western Australia during the 1970s. However information examined during this investigation did not reveal any links between this material and the operations of the APB.

## 1. BACKGROUND

During the 1970s and 1980s Agriculture Protection Board (APB) workers, and workers in other Western Australian government departments such as Forests and Public Works, used the chlorphenoxy herbicides known as 2,4-D and 2,4,5-T for weed control programs. Concerns have arisen that the health of APB workers in Western Australia’s north-west may have been adversely affected by use of these chemicals. To investigate these concerns the Minister of Agriculture, Forestry and Fisheries commissioned the Kimberly Chemical Use Review in October 2001. This review was undertaken by Dr Andrew Harper, a private medical practitioner specialising in Occupational Medicine and Public Health. Dr Harper presented his

Kimberley Chemical Use Review report in June 2002 and it is known by the name of its author as the Harper report. **Harper's conclusion 5 was that "exposure to unregulated levels of dioxin cannot be ruled out."** Dioxins are toxic chemicals sometimes found as contaminants in 2,4,5-T herbicide products. The Western Australian government released a response to the Harper report in September 2002 (extract relevant to conclusion 5 at Appendix 7). In this response the government accepted Harper's conclusion 5. It also set up an expert medical panel to evaluate the Kimberly Chemical Use Review recommendations as well as other issues relevant to the Review. **To conduct this task, the panel needs to be well informed on the likelihood that the APB workers were or were not exposed to higher than regulated levels of dioxins in the product 2,4,5-T during the relevant period (1975 – 1985). This project was designed to provide that information.**

## 2. METHOD OF APPROACH

There were two main aspects to the project:

1. The regulatory controls in existence in Western Australia for acquisition and use of the herbicides used during the relevant period. Details of these controls would provide information on whether permissible dioxin levels in the product 2,4,5-T may have been exceeded in products used by APB operators.
2. Details of any monitoring programs of the 2,4,5-T products conducted during the relevant period. If available, this information would provide details of actual dioxin levels in products used by the APB workers allowing comparison with relevant standards.

**In addition, during the investigation it became apparent that rumours or a "rogue batch" of 2,4,5-T with high dioxin content had been used in Western Australia and this aspect was followed up in detail.**

These aspects were investigated by reference to available information for the relevant period from:

records of WA government departments of Agriculture, Conservation and Land Management, Health, the Agriculture Protection Board and Chemistry Centre (WA);

minutes, correspondence and reports of the Pesticides Advisory Committee (PeAC) to the Minister for Health;

contacts with government officers past and present who have been involved with regulation, monitoring and control of these herbicides in WA;

reports of analysis of herbicide formulations including those of the national monitoring programs;

contacts with officers of commonwealth and interstate government agencies;

contacts with other individuals in Western Australia and other states with reputed knowledge/expertise of the subject matter. These contacts included past staff of Chemical Industries Kwinana Australia Pty Ltd which was a major supplier of 2,4,5-T at the CIK plant in Kwinana at the time.

Information available through the records of Western Australian government departments was not complete due to the passage of time. Not all records were available, some may have been disposed of in accordance with Retention and Disposal Schedules approved under the Library Board Act 1951 - 1983 and/or the State Records Act 2000. Similarly enquiries made through Commonwealth government agencies revealed that certain records were unavailable.

## 3. GLOSSARY OF TERMS - CHEMICAL NOMENCLATURE

The major focus of this report is potential contamination by dioxins in phenoxy herbicide products containing 2,4,5-T and used in Western Australia during the relevant period. The table below provides an explanation of the terms used

commonly in discussion on phenoxy herbicides and used throughout this report. Of particular interest are chemicals and processes which may lead to formation of dioxins which could contaminate the herbicide products.

**Common name Chemical Name and Comments**

**Phenoxy herbicides**
Also known as chlorophenoxy herbicides. The family of herbicides including 2,4-D and/or 2,4,5-T in acid, ester or amine or alkali metal salt forms.

**2,4-D** 2,4-dichlorophenoxyacetic acid. Produced from 2,4-dichlorophenol and monochloroacetic acid. 2,4-D is used commercially as ester derivatives or amine salts.

**2,4,5-T** 2,4,5-trichlorophenoxyacetic acid. Produced from 2,4,5-trichlorophenol (TCP) and monochloroacetic acid. 2,4,5-T is used commercially as ester derivatives or amine salts.

**KTCP** Potassium trichlorophenolate. A derivative of trichlorophenol which has the same function in 2,4,5-T manufacture.

**TCDD or 2,3,7,8 TCDD**
2,3,7,8-tetrachlorodibenzo-para-dioxin. Produced as a by-product in manufacture of chlorinated phenols and the phenoxy herbicide 2,4,5-T.

**Dioxin** The term dioxin is often used trivially in reference to TCDD which is only one of a family of 75 chlorinated dibenzodioxins. TCDD is by far the most toxic member of this family. Related chemicals are the chlorinated dibenzofurans which are not considered in this investigation.

## 4. CONSIDERATIONS OF THE CHEMISTRY OF THE PHENOXY HERBICIDES: WHERE COULD DIOXINS COME FROM?

### 2,4-D

It is often considered that 2,4-D cannot contain dioxin (TCDD) due to the manufacturing process. Discussion in WHO (1989) supports the conclusion that the most toxic dioxin, 2,3,7,8-TCDD would not be expected to occur in 2,4-D provided good manufacturing practices are observed. However it should be noted that it is possible for other dioxins to be present in contaminated 2,4 dichlorophenol used to manufacture 2,4-D herbicide. These were not considered in this investigation.

### 2,4,5-T

Dioxins are known contaminants of 2,4,5-T. The main dioxin found in 2,4,5-T is 2,3,7,8-TCDD and this can occur in 2,4,5-T due to either of two principal reasons:

- contamination of feedstock 2,4,5-trichlorophenol with TCDD;
- formation of TCDD due to uncontrolled reaction during manufacture of 2,4,5-T.

### Chemical Analysis for Dioxins

The analytical chemistry of dioxins during the 1970s and early 1980s in Australia focussed on 2,3,7,8-TCDD. Lower reporting levels for TCDD in 2,4,5-T were typically around 0.1 – 0.01 mg/kg. Since that time, analytical chemistry techniques have advanced and all possible dioxin congeners can now be identified by a suitably equipped laboratory. Much lower limits of detection are also possible using modern techniques. However all analytical results from herbicide analysis during the relevant period and discussed in this report express dioxins as 2,3,7,8 TCDD. Other dioxins have not been reported. TCDD from any source is included in results for TCDD

analysis of 2,4,5-T herbicide products.
Due to the factors discussed above, this investigation focussed on TCDD content of herbicide products containing or based on 2,4,5-trichlorophenol and/or 2,4,5-trichlorophenoxyacetic acid both with and without other products such as 2,4-D and picloram, but not 2,4-D alone.

## 5. REGULATION OF PESTICIDES IN WESTERN AUSTRALIA

During the relevant period, administration of the Health (Pesticides) Regulations 1956 under the provisions of the Health Act (1911) was exercised by the Public Health Department. The Pesticides Regulations were made by the Minister for Health on the advice of the PeAC and assented to by the Governor of Western Australia. The PeAC role included management of all matters necessary for the protection of health and included control of manufacturing, packaging, labelling, carriage, storage, distribution, sale and use of pesticides. Only pesticides registered through the PeAC were permitted to be used in Western Australia. This registration role reverted to the Australian National Registration Authority in 1994.

The Australian Technical Committee on Agricultural Chemicals (TCAC) was a Commonwealth government body set up to harmonise amongst the states the registration, control, labelling, monitoring and use of pesticides. The TCAC and the PeAC took measures from time to time to monitor pesticides such as 2,4,5-T as a means of checking on the quality and ensuring standards of public health were not compromised. These measures included sampling of raw materials, batches of manufactured technical grade product and formulated products available for the retail market.
Appendix 1 to this report provides monitoring results for samples taken through the relevant period as part of national (TCAC initiated) and Western Australian monitoring schemes.
An extensive search of APB staff records and Hansard documents has been conducted by the Department of Agriculture and was included as Appendix 3 in the Harper report. No evidence was found in this work that supply and use of non-registered 2,4,5-T herbicide occurred within the APB or Department of Agriculture in Western Australia during the relevant period.

## 6. REGULATED LEVELS OF TCDD IN 2,4,5-T HERBICIDE USED IN WESTERN AUSTRALIA.

Industry standards for commercial 2,4,5-T products prior to 1975 included a maximum acceptable level for TCDD in 2,4,5-T products of 1 mg/kg. However no formal regulatory limit for TCDD content in 2,4,5-T herbicides could be found in Western Australia prior to 1975.
At its 80th session in 1975, the National Health & Medical Research Council (NH&MRC) considered available information on 2,4,5-T and TCDD and recommended the maximum permissible level of TCDD in 2,4,5-T herbicide in Australia be 0.1 mg TCDD/kg 2,4,5-T. A common way of expressing this is to use the term 0.1 ppm by weight. One of the principal driving forces for setting this level was the capability of analytical laboratories to achieve reliable levels of detection. The NH&MRC accepted that there was no point in setting a level below the minimum level which good laboratories could achieve in practice. Prior to this recommendation, no specific recommendation on TCDD content in phenoxy herbicides had been made by the NH&MRC. The United Nations Food and Agriculture Organisation had a specification of 0.1 mg/kg believed to pre-date the NH&MRC recommendation. The NH&MRC recommendation was built into the requirements of Australian Standard AS 1175-1976 which were followed in Western

Australia following the release of that standard. This was the guiding standard for 2,4,5-T from that time.
At its 94th session in 1982, the NH&MRC revised the maximum recommended level of TCDD in 2,4,5-T to 0.01 mg/kg.
In Western Australia the Government Gazette of January 1982 formalised the limit of 0.1 mg/kg for TCDD in 2,4,5-T under Schedule B of the Pesticide Regulations. In

**December 1982 the maximum permissible level under Schedule B Regulations was revised to 0.01 mg/kg in line with the revised NH&MRC recommendation (1982).**

## 7. 2,4,5-T SUPPLIES IN AUSTRALIA

During the relevant period there was strong competition in Australia for the 2,4,5-T business. Key players included international companies such as Dow Chemical Ltd, Union Carbide Australia Limited (UCAL) and Monsanto Australia Ltd as well as Australian companies including Nufarm Chemicals Pty Ltd in Victoria, Farm Chemicals Pty Ltd in Queensland and a Western Australian company Chemical Industries (Kwinana) Pty Ltd (CIK). An Australian government Tariff Board report (1973) indicated that in Australia at the time UCAL was producing 2,4,5-T products from basic raw materials, whilst Farm Chemicals, Nufarm and CIK were producing 2,4,5-T products from UCAL intermediates and/or imported materials. Other companies were formulating 2,4,5-T products for retail sale from materials supplied by the above companies.
The company Chemical Industries (Kwinana) Pty Ltd was a major supplier of phenoxy herbicides to government departments in WA during the relevant period. This company changed its name to CIK Australia Pty Ltd in 1981. It was taken over by Nufarm Chemicals Pty Ltd in 1985. Throughout this report the term CIK is used to refer to the company operating in Kwinana. This company had an affiliate in Singapore (Telsing Private Ltd) and was affiliated with Farm Chemicals Pty Ltd in Queensland.
In Western Australia, CIK had produced phenoxy herbicide formulations from around 1960 and were major suppliers to the WA government. At its Kwinana works, this company manufactured 2,4,5-T acid from imported materials and converted it to ester and amine forms. Due to changing community attitudes to the phenoxies and to the possibility of dioxins in 2,4,5-T products, sources of 2,4,5-T diminished during the seventies and in 1981 it is believed that there were only three commercial sources of 2,4,5-T acid in the (Western) world:

- CIK Australia Pty Ltd at Kwinana in Western Australia. The CIK plant was licensed under the Poisons Act Regulations in Western Australia to manufacture sixth schedule poisons including 2,4,5-T. Monitoring of TCDD content in 2,4,5-T products was regular at the Kwinana works;
- Ivon Watkins-Dow at New Plymouth in New Zealand. IWD supplied some WA users through Nufarm and in later years CIK;
- Celamerck at Ingleheim in Germany. This company was known to supply the company Nufarm in Victoria with 2,4,5-T for sale in Australia. In 1982, German federal authorities amended maximum permissible TCDD content in 2,4,5-T to 0.005 mg/kg. The Celamerck factory was complying with that limit in 1982 (correspondence from Nufarm to WA Commissioner of Public Health).

There were complicated commercial agreements between the major players. For example up until about 1981 CIK purchased trichlorophenol raw material used in 2,4,5-T manufacture from Dow Chemicals Australia Ltd. This raw material was a potential source of dioxin contaminants. It is known that CIK recognised this issue

and only purchased TCP with certification as to TCDD content. It is also believed that Dow Chemical purchased 2,4,5-T derivatives from CIK. Although the companies in the industry were in competition, trade occurred between them in 2,4,5-T intermediates and derivatives.

## 8. 2,4,5-T PRODUCTS USED BY THE APB DURING THE PERIOD 1975 - 1985

Registered products containing 2,4,5-T and available for use by APB workers during the relevant period are listed in Appendix 3. This list has been reproduced from earlier work by Casella (2002) but it is not exhaustive as purchasing records kept by the APB often referred to the product type only (eg "2,4,5-T ester" or "2,4,5-T amine").

Records of the APB examined during this investigation indicate these products were purchased according to normal state purchasing systems in use at the time. Recollections of key staff (at the time) support this. The tenders were let annually for herbicides to be purchased by the APB and other government departments. CIK were major suppliers of 2,4,5-T to WA government departments through the State Tender Board system. Users such as the APB ordered directly from the successful tenderer by referring to the State Tender Board Schedules. The Department of Public Health on behalf of the PeAC regularly sampled 2,4,5-T products, especially from CIK Kwinana, and arranged for dioxin analysis to be carried out. Results are summarised in Tables 1 and 3 below.

Transfers also occurred between government agencies in Western Australia. For example in 1976 the Forests Department sold or supplied 1,600 L of surplus 2,4,5-T amine stock to APB. This would have amounted to at least eight 200L drums of the chemical. In December 1984 the Forests Department ceased using 2,4,5-T and 1,317 L of surplus Tordon 105 (2,4,5-T plus picloram) was transferred to the APB. These products had been purchased through the State Tender Board system. These instances provide evidence that at least in these instances when surplus chemicals were available in quantity in the Department of Forests they were transferred to other users. This aspect has become important in both Forests (now the Department of Conservation and Land Management, CALM) and the APB due to publicity concerning "rogue batches" and "buried drum" issues discussed later in this report. There is also evidence in APB records that when small quantities of undiluted chemicals were available in agencies such as Forests and the APB they were disposed of in "normal" ways such as burying with contaminated containers and mixing drums. According to APB annual reports, the total amounts of 2,4,5-T used by the APB varied between about 3,000 and 8,500 litres per annum of various strength product during the period 1967 – 1976. Most of this was the ester form of 2,4,5-T which required dilution with diesel for use. Ester forms were considered to be more effective when treating woody plants. Amine forms of 2,4,5-T requiring application with water were also used after 1975. However accurate details of total annual usage were not obtainable after 1976. 2,4-D usage rates were much higher - about 100,000 litres per annum in some years.

It should be noted that at a dilution rate of 60:1 for application, for each 200 litre drum of 2,4,5-T ester used, less than 20 milligrams of TCDD was present (using the limit of 0.1 mg/kg) but 12,000 litres of diesel was used. The occupational health issues with the solvent may well have been a significant issue.

## 9. RESULTS OF MONITORING FOR DIOXIN IN 2,4,5-T

As mentioned previously in this report, analytical results for dioxins in the chlorphenoxy herbicides in Australia during the relevant period was limited to

analysis of 2,4,5-T for TCDD. There were also some analytical difficulties with analysis of certain types of formulations and those containing pentachlorophenol in the early years. Results for early national monitoring programs in particular did not include analysis of amine formulations nor products containing pentachlorophenol. This is not an issue for the APB as mainly 2,4,5-T ester formulations were used in the Kimberly area. Pentachlorophenol is not considered in this investigation.

**National Monitoring Programs**

National monitoring programs for pesticides were operating under the general direction of the TCAC during the relevant period. These programs concentrated on analysis of formulated products at the retail level. As part of this program, states were required to sample 2,4,5-T formulations for TCDD analysis at the Australian Government Analytical Laboratories (AGAL). However, during the relevant period there was a lack of cooperation between the various state government agencies due to commercial sensitivities and the results of national monitoring program samples within each state were provided only to the respective state. There were also industrial issues with handling of dioxin-containing products in some laboratories and consequently monitoring programs did not always run as intended. Some results from the national programs have been provided by communication between states from time-to-time. These are reported in Appendix 1.

Some summary data is also available, for example correspondence examined in government files includes a letter from the Secretary of TCAC to the Secretary of PeAC in WA dated 12 March 1981. This letter indicates that the results of the 1980 monitoring program (Australia wide) found that of 79 samples of 2,4,5-T taken for dioxin analysis, none were confirmed to contain TCDD above the 0.1 mg/kg limit. Twenty two samples from WA were known to be included in this data and none contained dioxin above the limit. However one sample from WA was not analysed due to damage of the sample before analysis. This was subsequently found to be from CIK batch 3880 which was the subject of a product recall due to TCDD content of 0.8 mg/kg. Batch 3880 is discussed in detail later in this report under “rogue batch”.

In 1982 the Commonwealth Department of Primary Industry in conjunction with the Standing Committee on Agriculture developed a coordinated monitoring scheme for TCDD in 2,4,5-T in every batch of 2,4,5-T manufactured and/or imported into Australia. This was a major shift in focus from the retail product monitoring scheme to the wholesale/manufacturing level. Results are not available from this program which did not continue beyond 1983. However the WA PeAC was conducting regular monitoring of products used in WA during the years 1980 – 1983.

**TABLE 1**
**Summary of TCDD tests in 2,4,5-T Products**
**National Monitoring Programs**

| Year | Program | State Sampled | MPL* | Tests | < MPL | Comments |
|---|---|---|---|---|---|---|
| 1976 | National | Various | 0.1 | 8 | 7 | 1 failure (NSW, 0.18 mg/kg TCDD) |
| 1977 | National | Various | 0.1 | 14 | 12 | 2 failures (Vic 0.15, SA 0.20 mg/kg) |
| 1977 | National | WA | 0.1 | 4 | 3 | 1 failure, 0.25 mg/kg |
| 1979 | National | WA (CIK) | 0.1 | 12 | 12 | no violations |
| 1980 | National | WA (CIK) | 0.1 | 15 | 13 | Batch 3880 CIK fail |
| 1981 | National | WA (CIK) | 0.1 | 12 | 12 | no violations |
| 1982 | National | WA (CIK) | 0.1 | 11 | 11 | no violations |

**TOTALS 76 70**

MPL: Maximum Permissible Level

One missing value in each of 1977 and 1980

Records examined do not indicate what action occurred when regulatory limits were exceeded other than reinforcement of the need to continue the sampling and monitoring programs. Monitoring results from national monitoring programs later than 1982 are not available in the records examined. It is known that industrial issues prevented analysis for TCDD at AGAL for some time in the early 1980s. The work was transferred to the Perth laboratory of AGAL in 1981 and continued until 1983 when it ceased. Discussion with AGAL staff indicate that these records are not available in Western Australia and are probably not readily available elsewhere due to archiving and/or destruction according to records management policy. Some other monitoring data is available – for example information from the Queensland Department of Primary Industry indicates the following summarised data from national monitoring programs:

**TABLE 2**

**Summary of TCDD tests in 2,4,5-T Products**

**National Monitoring Programs 1975 - 1982**

**Year Program State MPL Tests < MPL Comments**

1974 National Various 0.1 1 1

1975 National Various 0.1 4 3 Failure SA, 0.19 mg/kg

1976 National Various 0.1 30 26 1 failure NSW 0.18, 2
Vic (highest 0.20), 1
WA 0.25 mg/kg

1978 National Various 0.1 6 6

1979 National Various 0.1 2 0 Both failures Qld
highest 0.24 mg/kg

1980 National Various 0.1 7 7 no violations

1981 National Various 0.1 5 5 no violations

1982 National Various 0.1 1 1 no violations

**TOTALS 56 49**

These results provide a similar picture to table 1 above but some duplication of results in Tables 1 and 2 is possible. For this reason results in Table 2 are not used in summary statistics in this report.

**Western Australian Monitoring Programs**

The Western Australian Pesticides Advisory Committee also carried out sampling programs on batches of 2,4,5-T and trichlorophenol. Detailed results available from this program are included in Appendix 1. Government departments in Western Australia conducted some monitoring of 2,4,5-T products (eg Forests and Department of Agriculture) and these results, where available are also included in detail in Appendix 1. Results of WA monitoring programs are summarised in Table 3.

**TABLE 3**

**Summary of TCDD tests in 2,4,5-T Products**

**Western Australian Monitoring Programs**

**Year Program Sampled MPL Tests < MPL Comments**

1976 WA PeAC WA (CIK) 0.1 3 3 no violations

1977 WA PeAC WA (CIK) 0.1 4 4 no violations

1978 WA PeAC WA (CIK) 0.1 26 24 TCP raw material & 1
batch of 2,4,5-T (CIK)

1979 WA PeAC WA (CIK) 0.1 11 11 no violations

1979 WA PeAC non CIK 0.1 3 3 No violations

1980 WA PeAC WA 0.1 25 25 No violations
1980 WA PeAC non CIK 0.1 1 1 No violations
1981 WA PeAC WA (CIK) 0.1 2 1 Batch 3880, see "Rogue Batch" discussion later
1982 WA PeAC WA (CIK) 0.1 5 5 No violations
1983 WA PeAC WA 0.01 3 3 No violations
**TOTALS 83 80**
1 missing value in 1979
Results for 1984 and 1985 are not available as regular monitoring did not occur during these years due to the phasing out of 2,4,5-T.

## 10. DISCUSSION OF MONITORING RESULTS

Tables 1 and 3 above indicate results of monitoring 162 products (159 results and 3 missing values) containing 2,4,5-T or TCP from 1976 – 1983 revealed 9 were outside regulated levels for TCDD content. Of these, one was a raw material used at CIK. Three failures were commercial products sampled from other states, three were commercial products sampled in WA and two were from a failed batch of 2,4,5-T ester produced at CIK in Kwinana. This batch is not an issue for WA and is discussed later under the "rogue batch" section of this report. Except for this batch, no records were found of follow-up action by authorities when violations were recorded.

These results support the conclusion that dioxin levels in 2,4,5-T products monitored in Western Australia, including at least seventy one products from CIK, were generally within regulated levels during the late 1970s and early 1980s.

## 11. SUSPICIONS OF A "ROGUE BATCH" OF 2,4,5-T CONTAMINATED WITH HIGH LEVELS OF DIOXIN

**There has been publicity in Australia over the relevant period and since then concerning issues such as alleged dumping of Agent Orange chemicals into Australia after the Vietnam war. For example it is known that TCDD content in Agent Orange could be well above the 0.1 mg/kg limit depending on the origin of the batch (Hall and Selinger, Chemistry in Australia, 1981). Any imports of surplus Agent Orange chemicals into Australia could have had health implications for the Australian community.**

**Many of the references studied and contacts interviewed in this investigation had recollections of a "rogue batch" of 2,4,5-T in Western Australia around the relevant period. This material was claimed to have higher than permissible levels of TCDD. Persistent rumours remain for example within Western Australia (Harper 2002) and Queensland (information from Department of Primary Industries). These rumours contend that government spraying programs using these products may have endangered worker health and safety if higher than permissible TCDD contents were involved.**

Three separate issues have been noted in the government files and general literature examined:

**Alleged importation into Australia from Singapore around 1969 - 1971 of fire damaged potassium trichlorophenolate (KTCP) with high dioxin content. This issue has been linked in media publicity to possible dumping into Australia of excess Agent Orange chemicals from the Vietnam war around that time.**

**Recall of a batch of CIK Farmco Tree Kill 2,4,5-T ester herbicide, batch 3880 with TCDD levels above the maximum permissible level of 0.1 mg/kg at the time (mid-1981).** This issue seems to have been linked with that outlined above in rumours and press coverage about 2,4,5-T with high TCDD content.

**Alleged burial of drums (containing 2,4,5-T with high dioxin content) around**

**Western Australia. This may have been related to the Agent Orange issue above. These issues are discussed separately below.**

**Alleged importation into Australia around 1969 - 1971 of fire damaged potassium trichlorophenolate (KTCP) with high dioxin content from Singapore.**

Considerable discussion is provided on this matter due to the confusion arising from periodical outbursts of publicity which over time has clouded the issue. Background information is provided at Appendix 5.

**The issue attracted publicity around Australia in the early 1980s and was discussed by Hall and Selinger in Nature (1981a, 1981b) and Chemistry in Australia (1981). Discussion also occurred in Search (1981). Hall and Selinger estimated the quantities of chemicals related to 2,4,5-T manufacture entering Australia through Queensland and Western Australia during 1969 – 1971 were equivalent to a major proportion of the total 2,4,5-T usage in Australia. Details are provided in Appendix 5. Harper (2002) considered these issues but concluded that Australian Customs Department records are incomplete and do not allow full clarification at this time.**

Evidence from an Australian Tariff Board inquiry (1973) indicate that a large part of these imports may have been a 2,4,5-T precursor (KTCP) imported by CIK through Singapore from original TCP material manufactured in other countries including Japan. **Information from the Tariff Board inquiry revealed that in 1971 a large shipment (at least 22.5 tonnes) of allegedly fire-damaged KTCP entered Australia through Queensland and Western Australian companies related to CIK**. No record of the precise composition of the material nor any analysis of the material has been found. **A sample of material related to the alleged fire-damaged KTCP was taken by the Industries Assistance Commission, possibly from CIK in 1973. Although represented originally as KTCP, the sample bottle was labelled "2,4,5-T".** No record of its analysis has been found until March 1981 when publicity on the issue again developed**. The sample was forwarded to the Chemistry Centre (WA) in 1981 and analysis revealed it to be 2,4,5-T ester with TCDD content of 26 mg/kg. This is 260 times the maximum permissible level at the time.** Details of the sample are presented in Table 4.

**TABLE 4**

**Analysis by the Chemistry Centre in 1981 of a Sample Related to Allegedly Fire Damaged Potassium Triclorophenate (KTCP).**

| **CCWA ID** | **Description** | **TCDD, mg/kg** |
|---|---|---|
| **81F797** | **One sample of viscous, dark reddish-brown liquid,** presumed 2,4,5-T ester, from Department of Science and Technology, AGAL Sydney received 25 March 1981. Reference NLR81/2472. **This sample was found to be approximately 63% mixed butyl esters of 2,4,5-T. It contained tarry material and had been stored for eight years before this analysis. The sample did not contain 2,4-D.** | **26** (acid basis) |

**The material in the sample was not KTCP nor was it Agent Orange as no 2,4-D was found. The sample contained tarry substances consistent with fire damage,** however the sample had stood for eight years before analysis. The Chemistry Centre report stated that ***"the TCDD present may be there from the manufacture of the 2,4,5-T ester or may have been produced by heating of trichlorophenols present by the exposure to fire that is supposed to have happened to this sample".*** No information as to how representative this sample was of the total amount of material has been found. Nor have details been uncovered as to the condition of the material, the sampling method or the storage conditions before analysis about ten years later**. No further information has been uncovered as to the fate of the remainder of the material.**

Based on the analysis of this sample, the material allegedly related to the firedamaged KTCP **was in fact 2,4,5-T ester with very high dioxin content.** Based on information from the Tariff Board inquiry and related matters, **the most probable scenario is that the material imported was low quality KTCP and attempts may have been made to manufacture 2,4,5-T ester from it. The sample analysed was taken from this derived material. Further information (confidential to the Tariff Board inquiry in 1972) indicates that no commercial use could be found for the material and it was earmarked for disposal in February 1972. No further information on this material has been found.** The records examined in this investigation did not reveal any links between the allegedly fire-damaged material and APB operations in Western Australia. The fate of this material is unknown.

In response to a private inquiry to the United States Embassy in Australia in 2001, the US Ambassador stated in his written reply *"The US Embassy has no knowledge of the receipt, shipment or subsequent use of Agent Orange or its components such as 2,4,5-T by Australian authorities, businesses or individuals. 2,4,5-T saw wide use as a general herbicide in the US, Australia and other countries during the 1960s and 1970s, and was not produced exclusively by US organisations"*. In a later paragraph in the same letter *"in the early 1970s the US military transferred its remaining Agent Orange and component materials to its disposal facility on Johnston (Kalama) atoll in the Pacific Ocean where the materials were destroyed during the 1970s by incineration"*.

**Queensland Government Search**

In 2002 the Queensland government reacted to community concerns and initiated a search of its records through the Department of Primary Industry to uncover any information concerning the alleged importation of 2,4,5-T products from Singapore during the period 1969 - 1971. **The material was claimed to have been imported into Queensland through a company which is now defunct but thought to be Farm Chemicals Pty Ltd of Eagle Farm. This company was associated with CIK in Western Australia and Telsing in Singapore.** Records of importation of the alleged fire-damaged material were not revealed.

Summary of Knowledge of the Importation of the Fire-damaged KTCP

The information concerning the importation during 1969 – 71 of 2,4,5-T including a batch of fire-damaged material is not complete. It is not possible to conclude whether this material may have contributed to the risk of dioxin exposure of APB(or other) workers in Western Australia during the relevant period. **There is evidence that a large consignment of the fire-damaged material was imported into Western Australia and unsuccessful attempts may have been made to convert it into commercially viable goods. Plans to dispose of the material in February 1972 were made by the importer. No knowledge of the disposal of this material has been discovered.** However data provided by monitoring schemes in Western

Australia during the relevant period did not indicate any high TCDD-containing materials in the products sampled and used by government departments.

**Recall of a batch of CIK Farmco Tree Kill 2,4,5-T ester herbicide, batch 3880 with TCDD levels above the maximum permissible level of 0.1 mg/kg at the time (mid-1981).**

Confusion seems to have arisen between the KTCP issue discussed above and the recall of an off-spec batch of 2,4,5-T produced by CIK in 1980, even though the events occurred about 10 years apart. The recall had been ordered by the WA Public Health Department and was reported in the West Australian newspaper, 4 September 1981. Details of the faulty batch are set out in Table 5.

**TABLE 5**
**Analysis of CIK Farmco Tree Kill 2,4,5-T Herbicide**
**Batch 3880 (Chemistry Centre results).**

This was a batch of "off-spec" product with high dioxin content. The batch was recalled from NSW.

| **CCWA ID** | **Date CCWA file reference** | **Type of CIK product** | **TCDD, mg/kg** |
|---|---|---|---|
| 81F2797, 81F2866, 81F2943 | 9/81 2.1.04/02 refers, f 3. | CIK Farmco Tree Kill 2,4,5-T ester herbicide batch 3880 | **0.8*** |

* This sample was analysed as a number of sub-samples by CCWA and AGAL during 1981. Results ranged from 0.39 – 0.87 depending on the sub-sample. All results were well above the MPL of 0.1 mg/kg at the time. An earlier sample was taken on 23 June 1980 but this sample had been damaged and no analysis was done. Re-sampling of this batch occurred in December 1980.

The Batch 3880 2,4,5-T product had been sent to NSW government clients including the Prickly Pear Commission and Forestry Commission. The CIK Sydney distributor confirmed that these were the only customers to receive material from the batch. CIK confirmed that 122 twenty litre containers (total of 2,430 L material) were returned to CIK Kwinana from NSW. Estimates of the total amount of product in this batch vary from about 2,430 to about 3,840 litres depending on the source of the information. The recalled product remained on site at CIK Kwinana works at the time Nufarm Limited acquired CIK in July 1985. Nufarm developed plans to blend the off-spec product with fresh product from IWD in New Zealand over time until all off-spec product was consumed. Evidence has been found in files of the WA Department of Health that all returned product had been blended with fresh 2,4,5-T until the resultant product had TCDD content of <0.1 mg/kg. This operation was not concluded until 1987 when the maximum permissible limit was 0.01 mg/kg. The blended material was approved for transport to the Victorian premises of Nufarm where it was to be further blended to conform with the limit of 0.01 mg/kg before use.

To clarify confusion about the recalled batch and a possible "rogue batch", in a letter to the Pesticides Advisory Committee dated 9 November 1981, the Australian manager of CIK Australia Pty Ltd stated in reference to batch 3880:
*"With respect to KTCP importation we wish to advise as follows:*
*1. At no time has CIK Australia Pty Ltd, or any of its associates, produced 2,4,5-T acid or 2,4,5-T acid derivatives from what has been referred to as "Fire damaged KTCP".*
*2. No fire damaged KTCP has been disposed of by the above companies within Australia, nor is it held in storage in Australia".*
These were essentially the same words communicated by the Australian manager of CIK to the Industries Assistance Commission in connection with the unconnected matter of the allegedly fire-damaged batch of KTCP in 1971.
It could be surmised from this statement that if CIK or an associated company imported the fire-damaged material, they did not try to manufacture 2,4,5-T from it or else they disposed of the material overseas. **However the statement conflicts with earlier statements made in confidence as evidence to the Tariff Board inquiry in 1973 and is not consistent with the existence of the fire-damaged sample discussed previously in this report (see Appendix 5). The Australian manager of CIK was asked in 1981 by the WA Commissioner of Public Health to clarify this position but declined to provide an answer.**

**Alleged burial of drums (containing 2,4,5-T with high dioxin content) around Western Australia.** This may have been related to the Agent Orange issue above alleging importation of surplus 2,4,5-T chemicals from Vietnam through Singapore.
Further publicity on the potential for Agent Orange type products from Vietnam being dumped in Western Australia occurred in early 2002 (Weekend Australian, January 12-13, 2002). Following this a state-wide search for suspected stockpiles of buried drums of herbicide took place during 2002. Agriculture Protection Board and CALM workers past and present indicated that buried drums could exist in Derby and Dwellingup respectively.
The Department of Agriculture and CALM engaged a consultant to investigate the Derby and Dwellingup claims respectively. No indications that chemical drums were buried at the suspected sites in Derby were found. Analysis of the contents of three metal drums found around the depot indicated one contained 2,4,5-T herbicide and was labelled to that effect. Another contained residues of diluted 2,4,5-T. The third was found to be an empty oil drum. Further investigations have taken place around the Derby rubbish tip and areas known as the Pindan Block and Derby airport depot without turning up evidence of buried chemical drums.
At Dwellingup, five sites were excavated and 25 drums retrieved. Anecdotal evidence suggested the drums were buried in the late 1960s – early 1970s as part of normal clean-up/disposal operations. Some of the drums contained concentrated 2,4,5-T residues. Some contained mixtures of 2,4,5-T and 2,4-D.

One drum, possibly buried around 1971 – 72, contained 2,4,5-T ester with a TCDD content of 3.9 mg/kg. This figure is above all standards for TCDD content applied in Australia during the 1970s and 1980s. The anecdotal evidence of the time of burial of this drum does not indicate a link to the importation of the fire damaged material previously referred to as the fire damaged material was stored at least until 1973 when it was sampled. The significance of this drum with respect to APB worker exposure is unclear at this time. The consultant's report on the

Dwellingup drums issue has been released only in draft from as at the time of writing this report.

As part of the rumours associated with the buried drums issue, a Department of Agriculture store at Karratha was also examined for possible presence of contaminated drums of 2,4,5-T. These yellow drums were found to be dry but may at some stage have been used for mixing herbicides.

## 12. CONCLUSIONS

Information from this investigation indicate that:

no evidence has been found of Agent Orange from Vietnam being used in Western Australia as part of APB operations;

the APB regularly acquired supplies of 2,4,5-T through the Western Australian State Tender Board purchasing system during the period 1975 – 1985. Tenders were let annually. The process included formal arrangements for sampling and analysis during the period 1976 – 1982;

products used by the APB were approved for use and registered through the formal pesticide registration process administered by the Department of Health;

monitoring of dioxin levels in 2,4,5-T products including those used by APB workers occurred at both national and state level during the relevant period;

results of monitoring programs indicate very good compliance with maximum permissible levels of dioxin content in the products tested. Available monitoring also indicated products manufactured by CIK in Western Australia and used by the APB showed excellent compliance with the required standards for maximum permissible TCDD content. This company was a major supplier of 2,4,5-T products to the APB;

one batch of faulty 2,4,5-T ester herbicide was issued from the works of CIK Australia Pty Ltd in 1980/1981 but most if not all of this product was retrieved before use and reprocessed successfully. No evidence was found that this material was related to APB operations;

widespread claims of a “rogue batch” of 2,4,5-T with high dioxin content have been made from time-to-time and these still persist in Western Australia. The “rogue batch” claims have been associated, probably incorrectly, in media publicity with the recalled batch mentioned above;

**there is evidence that at least ten tonnes of fire-damaged KTCP, a chemical used in manufacture to 2,4,5-T, was imported by CIK Australia Pty Ltd into Western Australia around 1971. This material may have had very high dioxin level (one sample related to this material has been reported, dioxin content 260 times the legal limit at the time). Available evidence indicates unsuccessful attempts were made in Australia to convert this material into commercial products. No knowledge of the eventual fate of this material has been discovered;**

An investigation during 2002/03 into alleged buried pesticide residue drums in Dwellingup by the Department of Conservation and Land Management did not reveal specific Agent Orange type mixtures. However 2,4,5-T and 2,4-D residues were found in several buried drums. Residues of 2,4,5-T in one drum contained dioxin at 39 times the legal limit applicable from around 1975. The level found was also 3.9 times the commercially acceptable level at time of burial. Timings and the nature of the residues suggest the chemicals in this drum were not part of the imported 2,4,5-T precursor connected with rumours of a rogue batch of 2,4,5-T. The relevance of the material in the buried drum at Dwellingup to APB workers is unclear at this time.

**DOUG INGRAHAM**

15/08/03

# APPENDIX 1

**MONITORING RESULTS – DIOXIN IN 2,4,5-T PRODUCTS, 1976 - 1983.**

The TCDD figures expressed in these tables are generally expressed as mg TCDD/kg product on an acid basis. This means the results are converted from amine or ester form to the equivalent amount of acid form. Records found were not absolutely clear in some cases and some results may be expressed on "samples as received".

**NATIONAL MONITORING SCHEME SAMPLING PROGRAM**

**Analysis of Samples from Other States as Part of National Monitoring Scheme.**

**State**
**Sampled**
**Sample Details Sample Type TCDD,**
**mg/kg**

**AGAL report via DPI, 9/7/76, part of national sampling program 1976**

NSW Garden Pride Selective Clover and
Oxalis Killer
2,4,5-T triethanolamine salt n/a
NSW Chemspray Tree and Blackberry
Killer
2,4,5-T butyl ester plus 2,4-D **0.18**
NSW Amalgamated Chemicals Nocweed
2,4,5-T Weedkiller
2,4,5-T butyl ester 0.07
NSW Kurteff Bros Brush and Tree Killer 2,4,5-T butyl ester plus 2,4-D 0.05
NSW Lane's Creeping Oxalis and Clover
Killer
2,4,5-T triethanolamine salt N.D.
SA ICI Butoxone 80 Selective
Hormone Weedkiller
2,4,5-T butyl ester <0.01
SA Hart's Killaberry Hormone
Weedkiller
2,4,5-T butyl ester <0.01
SA Amalgamated Chemicals Butyl
Ester 80% Weedkiller
2,4,5-T butyl ester <0.01
SA Shell Weedkiller 2,4,5-T butyl ester <0.01
Vic Hart's Killaberry Hormone
Weedkiller
2,4,5-T butyl ester <0.01
Vic Hortico Blackberry and Tree Killer 2,4,5-T butyl ester N.D.
Vic Nufarm Chemicals 5T Brush Killer 2,4,5-T butyl ester N.D.

**AGAL report 76/11700 of 16/6/1977. Part of national sampling program 1977**

Qld Lane's 2,4,5-T butyl ester
technical, Canadian
2,4,5-T butyl ester <0.01
Qld Lane's 2,4,5-T butyl ester
technical, batch 6127
2,4,5-T butyl ester 0.02
Qld Farmco 2,4,5-T technical (Qld) 2,4,5-T butyl ester 0.03*
SA Pentacontact Herbicide (Crystal
Recovery Co, SA)
2,4,5-T, form unknown, 15%
pentachlorophenol (PCP)
**1.87***
SA V-7 Contact Weedkiller (Agchem,
SA)
2,4,5-T, form unknown, 15% PCP **0.94***
SA Weedone Special Liquid
concentrate Selective Herbicide
2,4,5-T butoxyethanol ester <0.01
SA Nufarm Burweed 80 (Nufarm
Chemicals Vic)
2,4,5-T butyl ester 0.03
SA Hortico Blackberry and Tree Killer
(Vic)
2,4,5-T butyl ester 0.02
SA Lane's Nocweed 2,4,5-T butyl ester 0.01
SA Five-T Brush Killer, Nufarm Vic 2,4,5-T butyl ester <0.01
SA Agchem V-23 Blackberry Killer 2,4,5-T butyl ester 0.05



**AGAL report 76/12033 of 16/6/1977. Part of national sampling program 1977**

Vic Hortico Blackberry and Tree
Killer, Hortico Vic
2,4,5-T butyl ester <0.01
Vic Lane's Blackberry & Tree Killer
(Bankstown NSW)
2,4,5-T butyl ester **0.15**
Vic Rentokil Blackberry Killer,
(Chatswood NSW)
2,4,5-T butyl ester <0.01
Vic Lane's 80% 2,4,5-T butyl ester 0.03
Vic Nufarm S-T Brush Killer sampled
Laverton North 12/8/76
2,4,5-T butyl ester **0.20**

* These products contained pentachlorophenol which was a known interferent for TCDD analysis at the time. These TCDD figures may not be reliable and are not used in summary statistics.

**State sampled**
**Product/Sample Marks Type TCDD, mg/kg**

**AGAL report 76/11700 of 16/6/1977. Part of national sampling program 1977**

WA Terra-T, WA 2,4,5-T ester 0.03
WA Butoxone-80 (ICI) 2,4,5-T butyl ester 0.03
WA Blue Cross Tree and Blackberry Killer n/a
WA Lane's Blackberry and Tree Killer (NSW) 2,4,5-T butyl ester **0.25**
WA Lane's 2,4,5-T butyl ester technical, batch W5272 2,4,5-T butyl ester 0.05

**Sample Date Reference TCDD, mg/kg**

**DPI to WA PeAC, ref 329-1-138A, part of national sampling program 1979**

All samples believed to be from WA, analysed by AGAL as part of national monitoring scheme
W1 27/6/79 Tech acid, 49/79 <0.01
W2 27/6/79 Tech acid, 49/79 <0.01
W3 2/8/79 64/79 0.01
W4 2/8/79 64/79 <0.01
W5 30/8/79 88 <0.01
W6 30/8/79 88 <0.01
W7 17/10/79 ester 52/79A <0.01
W7A 2/11/79 amine 103/79 <0.01
W8 17/10/79 ester 52/79A 0.04
W8A 2/11/79 Tech butyl ester 104/79 <0.01
W9 12/12/79 Tech ester 118/79 0.01
W10 12/12/79 Tech ester 118/79 0.01

**1980**

W11 2/6/80 Ester formulation 3780 0.04
W12 2/6/80 Tech ester 3780 0.09
W13 27/6/80 Tech ester 3880 sampled 23/6/80 n/a
W14 27/6/80 Tech acid 3980 sampled 23/6/80 **0.11**
W15 24/7/80 Tech ester 4080 sampled 22/7/80 0.07
W16 24/7/80 Tech acid 4380 sampled 22/7/80 0.08
W17 1/9/80 Butyl ester 4280 0.03
W18 2/10/80 Tech ester 4580 0.07
W19 2/10/80 Tech acid 4980 <0.01
W20 4/11/80 Ester 4180 0.03
W12 2/6/80 Repeat W12 0.08
W14 4/11/80 Repeat W14 0.02
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**DPI details to WA D of Ag, ref RM10612FILEV part of national sampling program**

W23 9/12/80 Tree Kill mixed butyl esters batch 3880 replacing W13 (broken) **0.39**
W24 9/12/80 T80 butyl ester 0.04
W25 9/12/80 TLV40 butoxyethyl ester <0.01
W26 31/12/80 ester 0.03
W27 31/12/80 ester tech emulsified 0.02

**1981**

W28 27/5/81 ester 0.01
W29 27/5/81 ester <0.01
W30 27/6/81 ester <0.01
W31 6/8/81 acid <0.01
W32 6/8/81 acid tech <0.01
W33 31/8/81 acid tech <0.01
W34 28/9/81 ester etch <0.01
W35 28/9/81 ester (comm formulation) <0.01
W36 2/11/81 acid tech <0.01
W37 30/11/81 ester (comm formulation) 0.01
W38 30/11/81 acid tech <0.01
W39 23/12/81 ester tech <0.01

**1982**

W39A 28/1/82 acid comm <0.01
W40 8/4/82 acid <0.01
W41 14/4/82 acid <0.01
W42 19/4/82 acid <0.01
W43 30/4/82 acid <0.01
W44 6/5/82 acid <0.01
W45 14/5/82 acid <0.01
W46 19/5/82 acid <0.01
W47 22/5/82 acid <0.01
W48 24/5/82 acid <0.01
W49 27/5/82 acid <0.01

**Monitoring of Chemical Industries Kwinana Products through Western Australian government departments (Chemistry Centre results).**

**CCWA ID**
**Date CCWA file reference Type of CIK product TCDD,**

**mg/kg**
**1976**
26919/76 11/76 97/76/105, 97/76/103 CIK phenol sample ex PHD <0.02
26920/76 11/76 97/76/105, 97/76/103 CIK monochloroacetic acid ex PHD <0.04
26924/76 11/76 97/76/105, 97/76/103 CIK 2,4,5-T butyl ester ex PHD <0.02
**1977**
43677 11/77 57/76/146 amine ex PHD <0.06
43678 11/77 57/76/146 ester ex PHD <0.06
43677/77 11/77 57/76/146 CIK 2,4,5-T amine <0.06
43678/77 11/77 57/76/146 CIK 2,4,5-T ester <0.06
**1978**
41019/78 4/78 57/76/169 CIK 2,4,5-T acid <0.02
41243/78 5/78 57/76/169 amine ex D of Ag <0.02
42144/78 8/78 57/76/172 ester ex D of Ag <0.02
43257/78 8/78 57/76/197 ester ex PHD <0.01
43258/78 8/78 57/76/197 ester ex PHD <0.01
43097/78 8/78 20/97/181, 199 acid ex PHD <0.01
43098/78 8/78 20/97/181, 199 acid ex PHD <0.01
43099/78 8/78 20/97/181, 199 ester ex PHD <0.01
43100/78 8/78 20/97/181, 199 ester ex PHD 0.05
Evaluating Exposure of Former
APB Workers to Dioxins in 2,4,5-T
August 2003 24.
43214/78 8/78 130/78/20 ester ex PHD <0.01
43215/78 8/78 130/78/20 ester ex PHD <0.01
43216/78 8/78 130/78/20 ester ex PHD 0.04
43217/78 8/78 130/78/20 ester ex PHD 0.05
43097/78 8/78 20/77/181,199 CIK 2,4,5-T acid <0.01
43098/78 8/78 20/77/181,199 CIK 2,4,5-T acid <0.01
43099/78 8/78 20/77/181,199 CIK 2,4,5-T ester <0.01
43100/78 8/78 20/77/181,199 CIK 2,4,5-T ester 0.05
43101/78 8/78 20/77/181,199 technical 2,4,5 TCP ex CIK <0.01
43102/78 8/78 20/77/181,199 technical 2,4,5 TCP ex CIK **0.19**
43213/78 8/78 130/78/20 technical 2,4,5 TCP ex CIK <0.02
43214/78 8/78 130/78/20 CIK 2,4,5-T butyl ester <0.01
43215/78 8/78 130/78/20 CIK 2,4,5-T butyl ester <0.01
43216/78 8/78 130/78/20 CIK 2,4,5-T butyl ester 0.04
43217/78 8/78 130/78/20 CIK 2,4,5-T butyl ester 0.05
43258/78 8/78 57/76/197 and PHD CIK 2,4,5-T ester from P&F
Supplies Kenwick, “CHEMEX 80”
<0.01
44163/78 11/78 JHG 729, p119 Batch B24/99C/3 2,4,5-T **0.15**
**Other results including non-CIK products 1979**
40092/79 1/79 JHG 729, p138 CIK 2,4,5-T ester, marks 579 <0.01
40093/79 1/79 JHG 729, p138 CIK 2,4,5-T ester, marks 679 <0.01
40094/79 1/79 JHG 729, p138 DOW 2,4,5-T ester 0.08
40627/79 3/79 PHD Chemix 2,4,5-T ester (CIK) ex
Forests Dept Collie through PWD
<0.03
41850/79 7/79 130/78/71 Tordon 105 (picloram + 2,4,5-T
amine) ex Dept of Ag
<0.01
41851/79 7/79 130/78/71 Tordon 255 (picloram + 2,4,5-T
ester) ex Dept of Ag
<0.01
41852/79 7/79 130/78/71 Tordon 5-20 (picloram + 2,4,5-T
ester) ex Dept of Ag
0.03
42653/79 9/79 JHG 739, p92 <0.02
42654/79 9/79 JHG 739, p92 <0.02
43578/79 9/79 130/78/131 CIK Farmco T 80 batch 9779 <0.02
43579/79 9/79 130/78/131 CIK Farmco T 80 batch 10679 <0.02
**Other results including non-CIK products 1980**
40247/80 1/80 130/28/155 Lane Blackberry&Tree Killer,
2,4,5-T ester + 2,4-D
<0.02
40248/80 1/80 130/28/155 Hortico Blackberry & Tree Killer,
ester
<0.02
40249/80 1/80 130/28/155 Butoxone 80 2,4,5-T ester <0.02
40250/80 1/80 130/28/155 Lane Creeping Oxalis & Clover
Killer, 2,4,5-T amine
<0.02
40251/80 1/80 130/28/155 Lane 2,4,5-T ester <0.02
40252/80 1/80 130/28/155 Tordon 255 mixture picloram+ester <0.02
40253/80 1/80 130/28/155 Tordon 5-20 Foliar Brushkiller,
picloram+ester
<0.02
40254/80 1/80 130/28/155 Tordon 105 Tree Killer,
picloram+amine
<0.02
40277/80 2/80 130/78/156 CIK Farmco TA20 2,4,5-T amine
ex Forests Dept
<0.02
40491/80 2/80 130/78/161 CIK Farmco TLV batch 5279 ex
Forests Dept
<0.02
40492/80 2/80 130/78/161 CIK Farmco ester batch 12279 ex

Forests Dept
<0.02
40994/80 3/80 130/78/161 CIK Farmco Tree Kill Oil Soluble
2,4,5-T ex Forests Dept
<0.02
40995/80 3/80 130/78/161 CIK Farmco T-80 ester batch 980
ex Forests Dept
<0.02
Evaluating Exposure of Former
APB Workers to Dioxins in 2,4,5-T
August 2003 25.
40996/80 3/80 130/78/161 CIK Farmco TLV40 ester ex
Forests Dept batch 4279
0.02
40904/80 5/80 2.1.4/02 refers, f 116 CIK Farmco Tree Kill Oil Soluble <0.02
40905/80 5/80 2.1.4/02 refers, f 116 CIK Farmco T-80 ester batch 980 <0.02
40906/80 5/80 2.1.4/02 refers, f 116 CIK Farmco TLV40 ester batch
4279
0.02
42066/80 6/80 JHG 740, p53 2,4,5-T acid <0.02
42067/80 6/80 JHG 740, p53 2,4,5-T ester <0.02
42068/80 6/80 JHG 740, p53 2,4,5-T ester 0.06
42069/80 6/80 JHG 740, p53 2,4,5-T ester 0.01
42070/80 6/80 JHG 740, p53 2,4,5-T amine <0.02
43058/80 8/80 107/80/25 2,4,5-TCP, drum 42 Chemical
Industries 24/7/80 M350/80 ex PHD
<0.01
43059/80 8/80 107/80/25 2,4,5-T acid Chemical Industries
24/7/80 M532/80 ex PHD
0.02
43060/80 8/80 107/80/25 2,4,5-T butyl ester Chemical
Industries 24/7/80 M532/80 ex PHD
0.05
**1981**
81F2943 9/81 135/81 CIK Farmco Tree Kill 3880 2,4,5-T
ester, sent by NSW pesticide
registration section
**0.76**
81F3630 10/81 135/81 CIK Farmco Tree Kill Oil Soluble
2,4,5-T herbicide batch 2281
<0.01
**1982**
82F4367 10/82 2.1.04/02 refers, f74 CIK Farmco T-80 batch 9979, ex
NSW Dept of Agriculture
<0.01
82F4368 10/82 2.1.04/02 refers, f74 CIK Farmco Tree Kill batch 2182,
ex NSW Dept of Agriculture
0.01
82F4369 10/82 2.1.04/02 refers, f74 CIK Farmco T-80 batch 2282, ex
NSW Dept of Agriculture
0.01
83F 6080 12/82 65/85/110 CIK Farmco TA 200 amine batch
5682 ex Forests Dept
<0.01
83F 6081 12/82 65/85/110 CIK Farmco TA 200 amine batch
882 ex Forests Dept
<0.01
**CIK products 1983**
83F280 1/83 65/85/112 CIK Farmco TA 200 amine batch
4082 ex PWD Harvey
<0.01
83F279 1/83 65/85/112 CIK Farmco TA 200 amine batch
5682 ex PWD Harvey
<0.01
83F1067 3/83 65/85/114 CIK Farmco TA 200 amine batch
183 ex Forests Dept
<0.01
**Monitoring of Registered Formulations External to Western Australian Manufacture through the Pesticides Advisory Committee (Chemistry Centre results).**
**CCWA**
**ID**
**Description TCDD,**
**mg/kg**
41850/79 Dow Chemical (Aust Ltd) Tordon 105 Herbicide <0.01
41851/79 Dow Chemical (Aust Ltd) Tordon 255 Mixture Oil Soluble Brush Killer <0.01
41852/79 Dow Chemical (Aust Ltd) Tordon 5-20 Foliar Brush Killer 0.03
40277/80 Farmco TA 20 2,4,5-T Herbicide <0.02
Evaluating Exposure of Former
APB Workers to Dioxins in 2,4,5-T
August 2003 26.

# APPENDIX 2

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# APPENDIX 3

**List of Registered 2,4,5-T Products Available to the APB for General Use**

**Reg No** | **Product Name** | **Date Cancelled** | **Pack Size**

105 David Gray 2,4,5-T Ester weedkiller 8/79 20 0L
164 Terra Trading 2,4,5-T Ester special 11/79 n/a
326 ICI Butoxone 80 Selective weedkiller 10/84 200L
451 Kwinana Chemical 2,4,5-T Ester 80% 9/78 n/a
831 Hortico Blackberry Killer 7/83 n/a
842 CIBA-Geigy Weedone Special 2,4,5-T 7/80 200L
843 CIBA-Geigy Weedone Brush Killer 7/80 n/a
1224 Shell Herbicide B.80 8/80 200L
1510 Lanes Nocweed Butyl Ester 80 2/88 200L
2123 Chemex 2,4,5-T Ester 80 10/79 200L
2281 Dow Tordon 105 Tree Killer 9/80 200L
3199 Dow Tordon 5.20 Foliar Brush killer 9/80 n/a
3695 Dow Tordon 5.20 Herbicide 9/81 200L
3698 Dow Tordon 105 Herbicide 2/84 200L
3700 Dow Tordon 1040 Basal Bark Herbicide 2/88 200L
3820 Farmco TVL-40 Low Volatile 2,4,5-T Ester Herbicide 9/84 200L
3828 Farmco DT 20/20 Brush killer 8/88 200L
3868 Farmco Tree Killer Oil Soluble 2,4,5-T Herbicide 8/89 200L
3886 Farmco TA-800 2,4,5-T Ester Herbicide 6/91 200L
4013 Farmco TA-200 2,4,5-T Ester Herbicide 10/86 200L
4369 Farmco TLV-400 Special Low Volatile Brush killer 8/88 200L
4786 Elderado But-weed 400 Special Low Volatile B/Kill -/89 200L
4798 Elderado But-weed 80 B/Killer Herbicide -/89 200L
4809 Farmco Tree Killer LV-800 Low Volatile Herbicide 10/85 200L
4810 Farmco TVL-800 Low Volatile Brush Killer 10/85 200L

n/a: Not known, probably varies.

This list is not exhaustive for the relevant period (1975 – 1985). APB could have purchased/used other products from time-to-time as State Tender Board contracts were awarded.

Evidence from APB records is difficult to interpret due to use of abbreviated terminology such as “245T ester”, “sodium salt” and 245T amine” when describing products ordered. This applied particularly when purchasing CIK products. APB purchasing records examined indicate that 2,4,5-T products were often obtained from CIK in 200 L pack sizes.

# APPENDIX 4

## The Project Brief

# EVALUATING THE EXPOSURE OF FORMER AGRICULTURE PROTECTION BOARD SPRAY WORKERS TO DIOXINS IN THE HERBICIDE 2,4,5-T

# PROJECT BRIEF

**May 2003**

**DR MARGARET STEVENS**
**CHIEF MEDICAL ADVISER, POPULATION HEALTH**
**WEST AUSTRALIAN DEPARTMENT OF HEALTH**

## AIM

To provide information and advice to the Expert Medical Panel on the regulatory control of the chlorphenoxy herbicides and the monitoring of levels of dioxins in the chlorphenoxy herbicides used in Western Australia in the 1970s and 1980s.

## BACKGROUND

### The APB spraying program in the Kimberley

The APB, a government agency, ran programs to control noxious weeds in Western Australia. One of these programs was in the Kimberley, where 2,4-D and 2,4,5-T were used for the control of woody-stemmed weeds.

### The concerns of Kimberley spray workers

**People who worked in the APB spray program in the 1970s and 1980s have reported that they suffered ill health and continue to suffer ill health** resulting from exposure to the herbicides 2,4-D and 2,4,5-T.

The concerns of former APB spray workers who were employed in the Kimberley from 1975-1985 are documented in a report by Dr Andrew Harper, titled *The Kimberley Chemical Use Review*. The report describes the steps taken to identify the cohort of spray workers in the Kimberley, their reported use of and exposure to the herbicides, and their past and current health problems.

Dr Harper made five findings:

**1. Safety and work practices were inadequate relative to today's standards as well as to those in effect at the time.**

2. APB policies were consistent with advice from health authorities.

**3. Illness did develop in association with the spray. However this has tended not to be diagnosed by treating doctors as chemically-related illness**

4. Alienation has developed and is felt by those who were exposed to the spray

**5. Exposure to unregulated levels of dioxin cannot be ruled out.**

Based on these findings, Dr Harper made 16 recommendations, seven of which were predicated on a causal association between exposure to chlorphenoxy herbicides and illness. Cabinet accepted nine recommendations and referred the seven recommendations predicated on a causal relationship to an Expert Medical Panel for advice.

The report can be found at www.ministers.wa.gov.au.

### The use of unregulated herbicides

*Beliefs about the use of unregulated 2,4,5-T in the Kimberley*

**Dr Harper's report presents opinions that 2,4,5-T with levels of dioxin exceeding the upper limit determined by the NHMRC were used in the Kimberley. This belief is strongly held by the Kimberley community and at least one prominent medical practitioner in the Kimberley. It is part of a broader belief held by these people that Kimberley Aboriginal people were abused and used by government agencies to dispose of unwanted 2,4,5-T with unregulated levels of dioxin.**

On pages 90 and 91 of his report**, Dr Harper presents the evidence which supports this belief that former APB workers were exposed to 2,4,5-T with high levels of dioxin:**

**'The finding that the WA Government Chemical Laboratories determined dioxin levels in an imported sample to be greater than 200 times above the 0.1mg/kg 1975 standard. However this finding was not reported on other testing.'**

**'Positive soil tests for dioxin in Derby at the APB store site recorded in 1999.'**

**'The dumping of large amounts of chemical on the market between 1969 to 1971 sufficient to disturb the balance of the existing trade in 2,4,5-T.'**

**'The brief history of trade in the chemical through Singapore by a company associated with Chemical Industries (Kwinana) Pty Ltd.'**

**'The concurrent surplus of Agent Orange from Vietnam with suspicion of some of this entering trade and with Australia possibly participating in this trade.'**

**'Involvement of Government in questioning these matters as from the very early 1970s.'**

**'Failure of the authorities and importers to explain the irregularities in importation and contamination with associated incomplete records.'**

**'High incidence of illness in those exposed to herbicides.'**

**'Observations among the operators spraying weeds of inconsistencies in the appearance and nature of 2,4,5-T, lack of uniformity in colour, age and quality of the drums, an absence of labelling and the sudden availability of an unexpected supply of 2,4,5-T.**

**At the meeting of the Expert Medical Panel in November 2002, Dr Harper reaffirmed his belief that 2,4,5-T with high dioxin levels may well have been used in the Kimberley.**

**The regulation of dioxin in 2,4,5-T**

During the years 1975-1985 the registration of pesticides was by the WA Public Health Department, with advice on the chemical use being provided by the NHMRC. Testing of chemicals for levels of TCDD was undertaken, and, prior to 1982, the upper limit of dioxin permitted was 0.1mg/kg. **In 1982, the NHMRC revised the upper limit for dioxin in 2,4,5-T downward to 0.01 mg/kg,** as better analytical techniques allowed for the precise measurement of this lower level.

File notes in Appendix 3 of the Harper report refer to testing of 2,4,5-T by the Government Chemical Laboratories in 1973 and 1974; with a further indication that testing was being done by the Laboratories in 1978 and that dioxin levels were within those set by the Australian Standard AS 1175.

Minutes of the Pesticide Advisory Committee from October 1980 mention a National Monitoring Scheme and further Minutes from 1981 note that results of TCDD levels in 2,4,5-T from NSW, Queensland and Tasmania have not been received by the Committee.

**Purchasing of 2,4,5-T**

The APB was a government agency and all purchasing of equipment and consumables would have been via a formal tender process. Note on this are in Appendix 3 of the Harper report.

**Role of the Expert Medical Panel**

The Expert Medical Panel is to advise the Western Australian government on the scientific evidence that ill health among former APB workers was associated with exposure to the herbicides, as reported by Dr Harper. A clear understanding of the chemical composition of the herbicides to which this cohort was exposed would assist this work.

The Panel has noted the beliefs of the Kimberley community that workers were exposed to unregulated herbicides and the anger associated with this. The Panel feels that these beliefs should be investigated as part of the full investigation of the health concerns of former APB workers.

**Analysis of the causal association between ill health and pesticide exposure**

The Panel has contracted a review of the literature to ascertain the symptoms, diseases and causes of death associated with exposure to the herbicides 2,4-D and 2,4,5-T and dioxin. The Panel will look for similarities between the reported health outcomes of the Kimberley APB workers and the health outcomes of other exposed cohorts.

The exact herbicide exposures of the Kimberley cohort are unknown. **The Harper report documents robust information that the spray workers did, on the whole, experience significant exposure to the herbicides. The evidence from government files does not contradict this. The Harper report also asserts that the herbicide 2,4,5-T had high levels of dioxin.** The evidence from government files does not support this as government tender processes and the associated testing requirements would have detected and then excluded 2,4,5-T that did not fall within specifications.
The health information on the cohort of former sprayers is imprecise. Cause of death is available on those that have died but for the majority of the cohort the health data provided are self-reported symptoms following exposure and now.
Given the dearth of precise health information and exposure information upon which the analysis will draw, it would be helpful for the Panel to be well informed on the likelihood that the APB workers were or were not exposed to higher than regulated levels of dioxins in the 2,4,5-T.

**CONTENT AND METHOD SPECIFICATIONS**

The Consultant is required to provide information and advice to the Expert Medical Panel on the regulatory control of the chlorphenoxy herbicides and the monitoring of levels of dioxins in the chlorphenoxy herbicides used in Western Australia in the 1970s and 1980s. This project requires the Consultant to investigate all relevant avenues of information to assess the likelihood that chlorphenoxy herbicides with dioxin levels higher than those permitted by regulatory authorities at the time were used in the Kimberley APB weed spraying program.

As a minimum the Consultant should:

Critically assess the relevant information in Dr Harper's report;

Describe the regulatory controls of the chlorphenoxy herbicides in the 1970s and 1980s in Western Australia;

Document the source of the herbicides used in Western Australian government spraying programs, the testing programs for levels of dioxins in these herbicides and the results of the testing programs compared to the relevant standards;

To the extent feasible, access and assess information on the importation of 2,4,5-T into Australia in the period of concern, and comment on any limitations in the availability, accessibility and interpretation of the information.

Much of the evidence to inform this work has been abstracted form government files by the Department of Agriculture.

**Methodology**

The project plan should clearly state the hypotheses to be tested, the lines of investigation pursued and the methodology that supports each, the findings and conclusions.

**PROJECT SUPERVISION**

The methods and progress of the project will be overseen by Dr Margaret Stevens, acting for the Expert Medical Panel.

A full description of the scope of the review, documented in a project plan, is to be agreed prior to commencement of the work;

A complete, final draft of the report to be provided for the panel's appraisal and comment before finalisation.

**OUTPUTS AND TIMELINES**

It is expected that work on the contract will commence in May 2003 and that it will take around four weeks for the Consultant to prepare a complete, final draft for review. The final report will be submitted to the Department of Health in the following manner:

One bound printed copy and one unbound printed copy
One copy report on diskette, in Microsoft Word.

**SUBMISSION OF PROPOSALS**

Proposals should be no longer than 6 pages and must be provided in electronic format as well as hard copy (mailed or faxed). The proposal must show a good understanding of the project requirements and the issues to be addressed, contain a brief description of the methods to be followed, describe the expertise of the staff employed to undertake the work, give a detailed budget and provide a timeline, including anticipated commencement and completion dates.

Any potential conflict of interest or limitations to the broad acceptance of the work must be identified in the proposal.

## APPENDIX 5

**Background Material Concerning Importation of Chemicals 1969 – 1971**

Information on this matter has been summarised in the main body of the report. The following background information includes material originally provided in confidence to the Tariff Board inquiry in 1972/73. The Australian Productivity Commission has recently given approval to release the material in this report.

This issue attracted publicity around Australia in the early 1980s and was discussed by Hall and Selinger in Nature (1981) and Chemistry in Australia (1981). Discussion also occurred in Search (1981). Hall and Selinger obtained trade figures from the Australian Bureau of Statistics and Department of Customs for the period 1969 - 1971. They estimated the quantity of halogenated phenolic chemicals imported into Australia from Singapore during the period 1969 – 1971 was 310 tonnes. They associated these products with surplus Agent Orange stocks which they postulated may have entered world commercial trade around the early seventies. Their figures (Chemistry in Australia 1981 from Australian Bureau of Statistics) indicated that most of the chemicals entered Australia through Queensland (about 126 tonnes in 1970-71) with minor amounts into Western Australia (about 10 tonnes in 1970-71). Harper (2002) has investigated these issues but has concluded that Australian Customs Department records are incomplete and do not allow full clarification.

Hall and Selinger (1981) also estimated annual use of 2,4,5-T was around 220 tonnes per annum in Australia during 1969-70. Other estimates were observed during this investigation but this is a reasonable ballpark figure. As discussed, annual imports of "halogenated phenols" from Singapore during this period were about 150 tonnes per annum. These figures indicate the possibility that significant amounts of total Australian consumption of 2,4,5-- related products during the period 1969-71 were imported through Singapore. No specific knowledge of the quality or fate of any of the imported materials has been uncovered during this investigation.

Evidence from an Australian Tariff Board inquiry (1973) indicates that a large part of the imports during 1969 – 1971 may have been KTCP imported by CIK through Singapore from original TCP material manufactured in other countries including Japan. CIK had an associate company in Singapore (Telsing Private Ltd) which was producing KTCP. At that time KTCP could be imported with reduced tariff – this was changed following an Australian Tariff Board anti-dumping inquiry in 1972. This chemical could then be used to produce 2,4,5-T herbicide products at a commercial advantage. **At about the same time a fire occurred in the Singapore factory and a quantity of allegedly fire-damaged KTCP was subsequently imported into Australia by CIK and/or an associated company possibly Farm Chemicals Pty Ltd of Eagle Farm Queensland. At least one person was known to be a Director of both companies.** The Tariff Board report indicates that this shipment occurred on 23 April

1971. This material was the subject of an application by the importer for a tariff reduction due to its diminished value caused by the fire. This application was granted based on evidence presented by the importer as to the nature of the diminished value of the material.

A sample of material related to the alleged fire-damaged KTCP was taken by the Industries Assistance Commission (possibly from CIK in 1973). Although represented originally as KTCP, **the sample bottle was labelled "2,4,5-T".** No record of its analysis has been found until March 1981 when publicity on the issue again developed. The sample was forwarded to the Chemistry Centre (WA) in 1981 and **analysis revealed it to be 2,4,5-T ester with TCDD content of 26 mg/kg. This is 260 times the maximum permissible level at the time.** No knowledge was found as to the sampling method, how the material was stored during the period between sampling and analysis (about 8 years) nor how representative the sample was of the total amount of material available.

**Based on the analysis the material in the sample was not KTCP nor was it Agent Orange as no 2,4-D was found. The sample contained tarry substances** consistent with fire damage, however the sample had stood for eight years before analysis. The Chemistry Centre report stated that "*the TCDD present may be there from the manufacture of the 2,4,5-T ester or may have been produced by heating of trichlorophenols present by the exposure to fire that is supposed to have happened to this sample*". **No further information has been uncovered as to the fate of the remainder of the material.**

**Considering information from the Tariff Board inquiry and related matters, the most probable scenario is that the material imported was KTCP and attempts have been made to manufacture 2,4,5-T ester from it. The sample analysed was taken from this derived material.**

In exchange of information in 1981 between the WA Ministers for Health and for Conversation and the Environment, **a contradiction was referred to between key statements made by the Australian manager of CIK, also a director of Farm Chemicals Pty Ltd, to the Australian Industries Assistance Commission. Further information on this contradiction was included in correspondence between Commonwealth and Western Australian government agencies.** On 23 April 1981 the IAC wrote to the Department of Home Affairs and Environment. **In this letter, it was mentioned that CIK had applied for the reduced tariff on the fire damaged material on the basis that they had attempted to manufacture useful 2,4,5-T from it in Australia but had failed – hence the sample to prove it. They could not sell the derived products** because of customer resistance to the colour and poor handling properties of the material. The Tariff reduction was granted, apparently based on this information. This information was passed in confidence to the WA Minister for Health by the Minister for Conservation and the Environment in November 1981.

In response to publicity arising from the Hall and Selinger data, CIK had been requested to provide the Department of Home Affairs and Environment with certain information concerning the alleged fire-damaged batch of KTCP. The Australian manager of CIK advised DHEA by Telex on 4 June 1981 as follows (subsequently passed on to the WA Minister for the Environment):

1. At no time has Chemical Industries Kwinana Pty Ltd, or any of its associated companies, produced 2,4,5-T acid or 2,4,5-T acid derivatives from what has been referred to as "Fire damaged KTCP".
2. No fire damaged KTCP has been disposed of by the above companies within Australia".
3. At no time have any of the above companies imported into Australia the crude

2,4,5-T/2,4-D product referred to as Agent Orange. To the best of our knowledge Agent Orange has never been imported into Australia.
A follow up Telex of 16 June indicated CIK agreed "produced" could be expanded to include "manufactured, marketed or sold". These words were reproduced in part in a letter from CIK to the WA PeAC on 9 November 1981 as discussed in the main body of this report.
**It should be noted that these words do not explicitly deny that KTCP was imported, nor that fire damaged KTCP was not used in some way nor that fire damaged 2,4,5-T was not imported.**
**There were clear inconsistencies in the evidence provided to the Tariff Board inquiry and the information provided by CIK in 1981 concerning importation and/or use of the fire-damaged KTCP. In particular point 1 above is in direct contradiction with information provided to the Tariff Board inquiry about nine years previously.**
Information received from the IAC in connection with the Tariff Board Inquiry quotes from a letter from CIK as follows:
**"Also I wish to advise that even now we still have about $6,000 of 2,4,5-T ester made from this damaged material, and it is too charred to sell or use. I am considering buying equipment to distil it under high vacuum, but it is partly destroyed at the high temperature involved. I am sending you a sample of the consignment. Normally it is a yellow, oily material. This stuff resembles molasses.**
A further letter dated 1 January 1973 reads as follows:
"…… Hence we lost considerably from outright destruction, and even more from material partly damaged. **This was put aside as the local Manager had insufficient knowledge to treat the great mass of stuff. When the works were shut down it was sent back to Brisbane with other good material in one final shipment.**
**When the KTCP arrived at Brisbane works we tried all we knew to make it into saleable T ester, with little results. We tried blending it in with pale amber product, but due to its intense black colour, even 3 to 4% was too much and our customers complained. At present we are holding about $6,000 worth at our Kwinana works, and we can do nothing with it and will be dumping it. I have sent you a sample** and will be glad for your representative to call and inspect what we are holding. I will defer getting rid of it until mid-February pending your decision to have a man call. One of the greatest problems of the stuff is the presence of a sort of resinous partly soluble suspension that comes out of solution when customers add it to water. This blocks up jets and it is quite impracticable to use it.
**The requested inspection was declined but receipt of the sample was acknowledged. It is that sample which was analysed and returned a very high TCDD content of 26 mg/kg. No records of other samples or analyses of materials related to the fire-damaged shipment has been found.**

A copy of the invoice for $14,200 was attached to the information provided by the IAC. This indicates 150 drums of Kofen (KTCP) amounting to around 22.5 tonnes of KTCP was involved. The shipment was dated 23 April 1971 from Singapore to Brisbane. Invoice was to CIK Western Australia. Shipping agent was Thorsorient. A hand notation indicated " the last shipment cleaning everything out of Singapore". Using these figures, the $6,000 worth in WA amounted to about 10 tonnes.
No other information as to the fate of this imported material has been found.

## APPENDIX 6
### List of Abbreviations
2,4,5-T 2,4,5-trichlorophenoxyacetic acid
2,4-D 2,4-dichlorophenoxyacetic acid

AGAL Australian Government Analytical Laboratories
APB Agriculture Protection Board
CALM Department of Conservation and Land Management
CCWA Chemistry Centre (WA)
DPI Queensland Department of Primary Industries
CIK The company CIK Australia Pty Ltd
IAC Industries Assistance Commission
IWD The company Ivor Watkins Dow
KTCP Potassium trichorophenolate
MPL Maximum Permissible Level
NH&MRC National Health and Medical Advisory Committee
PeAC Pesticides Advisory Committee
TCAC Technical Committee on Agricultural Chemicals
TCDD tetrachlorodibenzo-para-dioxin
TCP trichlorophenol
UCAL Union Carbide Australia Pty Ltd
WHO World Health Organisation

## APPENDIX 7
## RESPONSE OF THE WESTERN AUSTRALIAN GOVERNMENT TO THE CONCLUSIONS AND RECOMMENDATIONS OF THE KIMBERLEY CHEMICAL USE REVIEW
## 26 SEPTEMBER 2002

The following is the extract from the above response dealing with issue of exposure to unregulated levels of dioxin:

**Conclusion 5**

***Exposure to unregulated levels of dioxin cannot be ruled out.***

Government response

The Government accepts this conclusion. However, it would have been equally valid to conclude that there is no definitive evidence that exposure to unregulated levels of dioxin occurred. In fact, the information available appears to suggest that such an event was unlikely based on all the testing undertaken at the time.

If such exposure did occur, it would have arisen from the use in the spraying program of batches of 2,4,5-T not complying with the tender specifications in respect of levels of the contaminant TCDD. Evidence has recently been obtained of 2,4,5-T with high levels of TCDD being used in another spraying program conducted in Western Australia *. Although there have been allegations of such “contaminated 2,4,5-T” being used in the APB spraying program, definitive evidence is lacking. All known analyses of the 2,4,5-T used by the APB carried out by the then Government Chemical Laboratories, demonstrated compliance with the tender specifications.

The issue of dioxin exposure is not relevant to those workers using only 2,4-D.

Notes on the Government’s Response

* This evidence is probably the discovery at Dwellingup of one buried drum containing concentrated 2,4,5-T with a relatively high dioxin content.

# End of Ingraham Report

**********

ABC TV 730 report 10/03/2004:

CARL DRYSDALE, KIMBERLEY AGRICULTURE DEPT WORKER: All of a sudden we got all of these drums and then we asked where they came from.
MICK O'DONNELL: Most of the 245T the Derby workers used had come in drums like this one, clearly labelled by the Kwinana Company which sold it to the Agriculture Protection Board. **But the batch which arrived in Derby in the early 70s was unlabelled, in second hand drums.**
CARL DRYSDALE: **The original stuff was sort of like a honey consistency or an engine oil consistency and this stuff was dark brown with silvery coloured streaks through it.**
MICK O'DONNELL: And remarkably, workers on the other side of the country also recall a similar strange batch of the chemical arriving in the early 70s.
SID ARMSTRONG: **It was a black, sludgy looking stuff.**
**It looked like a black treacle.**
MICK O'DONNELL: **And those descriptions sound remarkably like the sample Canberra professor of chemistry Ben Selinger hunted down when he investigated a rogue batch of 245T in 1981.**
EMERITUS PROF BEN SELINGER, AUSTRALIAN NATIONAL UNIVERSITY: **The sample we had of the fire damaged stock was black and viscous and not like you'd expect pure 245T to look.**
MICK O'DONNELL: The mystery of the rogue batch takes us back to this plant, south of Perth. Chemical Industries Kwinana was importing 245T during the Vietnam War.
A report by the Tariff Board in 1971, tabled in Parliament**, found the company was importing fire damaged 245T from Singapore, dumped here at low prices.**
EMERITUS PROF BEN SELINGER: **Fire damage, particularly at the stage it was being transformed at in Singapore, would increase significantly the levels of dioxin in the 245T.**
MICK O'DONNELL: Is it possible that some of that ended up in the Kimberley, used by those workers?
PROF BRUCE ARMSTRONG: **I think it's certainly possible.**

**********

## ABC Radio – Chemical Consequences

**Carl Drysdale:** **Now this stuff that we got was dark brown, it was grainy, it blocked up the nozzles of the spray units, it was very thick and streaky. It definitely wasn't the regular run-of-the-mill 245-T. We certainly questioned where these drums came from because they were unmarked 44-gallon drums,** but unknown to us at that time, we didn't realise that it had to be a registered chemical. We were ignorant of the fact that this stuff was illegal chemical.

**Ben Selinger**: **It was fascinating looking at the Australian Bureau of Statistics figures, because Singapore was not known for a big manufacturer of herbicides, and nothing came from Singapore before '69 and nothing came after '71, so we got this huge big spike of imports via Singapore appearing in our import statistics.**

**Carl Drysdale:** Yes, well we had no protective gear at all, and we had this stuff on our back or slung over our shoulders, and you were covered in the stuff, from morning till night. **The recommendations for the use of this chemical are that it's so volatile that it should not be used above 24-degrees Celsius. Now there would not be a day that we used this stuff that would be below 34-degrees Celsius. It's probably more like 40-degrees.**

**Mark Horstman:** Other men were getting sick too. **They feared something was terribly wrong. They started asking for answers from the State government and the APB. They were especially suspicious about the mysterious unmarked drums of herbicide, containing 245-T that looked like molasses, instead of its usual oily honey colour.**

**Carl Drysdale:** We actually asked if it came from Vietnam and **we were laughed at and told it was harmless and just get on and do it and leave the research for the research people.**

**Mark Horstman:** On the other side of the country, in Canberra, Professor Ben Selinger was testing a theory. **Selinger suspected that most of the herbicides stockpiled in Australia in the early '70s was 245-T derived from war surplus ingredients contaminated with high levels of dioxin.** But he didn't know exactly how high the levels were.
**Ben Selinger:** We got this **message from a deep throat in Canberra that a rogue batch had come into Australia, that'd been fire damaged in Singapore and this stuff was far worse as far as one could tell, than the ordinary bad stuff that had come into the country.** So we wrote some of it up, it got some newspaper coverage and we had this rather frantic phone call from a public servant in Canberra saying a sample of that had been submitted to the Tariff Board, as part of the Tariff Board inquiry, and he still had this sample in his garage, and was it dangerous. And I said, 'Well, I wouldn't leave it there, particularly if you've got small children. Would you like us to take it away and make it safe?' And he said, 'Yes please', and so two of us went out there, took the sample straight to secure storage at the ANU, and then contacted the government analyst and said, 'We think you should analyse this'. And several months later, we contacted the Tariff Board again**, and they gave us the analysis of this sample, which was actually very, very high in dioxin, which is the crucial component that one worries about in 245-T.**

**Mark Horstman:** How high was the dioxin in that sample?
**Ben Selinger:** Well the official analyst's result was that it was **200 times the limit that had been set round about that time and about 2,000 times the limit that would now be regarded as safe**.
***(Note: 2600 times by 1982 when the Derby people were still utilising the chemical)***
**Mark Horstman:** It was imported by a company based in Western Australia, called Chemical Industries Kwinana.
CIK also had sister factories in Queensland and Singapore. The company was a major supplier of herbicides to the Agriculture Protection Board.
When the sample was tested and the dioxin was found to be 260 times over the legal limit, it was ten years after it had been made into 245-T by Chemical Industries Kwinana.

**Paul Davison: We started getting these semitrailer loads full of all these drums coming in, and they were all different coloured drums**. Some were marked, some weren't. Some were marked 245-T esters, in black drums. Anyway this particular batch, the first lot that came in, they unloaded it with the forklift off the truck, and I went to inspect it to have a look at it. **I took a bung out of one of the drums and looked inside, and it was all black, and not a golden colour like it should have been. And it was like a gooey black.**

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Now lets us look at extracts from Professor Andrew Harper's report, the

# Kimberley Chemical Use Review

***In other States:***

In a publication from the Victorian Vermin and Noxious Weeds Destruction Board in 1979, it was written "that with normal care**, a human being could not be exposed to levels of 2,4,5-T or dioxin which could cause any serious health problems**".

***WA Parliament denies medical evidence:***

The response to questions in Parliament regarding these cases was that there was **no evidence that the skin complaints were caused by contact with 2,4-D or 2,4,5-T.**

However this conclusion was not supported by the opinion of treating doctors in Kununurra as **reported in Parliament in 1982.**

***On Unmarked Drums:***

There is an undated Hansard question on the **name of the APB Officer who authorised the acquisition of 10,000 litres of waste chemical from Chemical Industries Kwinana.** The response was that all chemicals were acquired through the State Government Tender and supply process and that legislative requirements regarding labelling and product standards had to be met under the tender process. Reference to allegations in Parliament of unlabelled drums occurred in 1999. The response to this allegation was that records did not show the acquisition of unlabelled chemical drums.

*(WN: The question relates to an officer who "authorised". Note past tense; it was allegedly done. The Parliamentary response says there is no record. This is a dopey response**. Of course there is no record, the acquisition was obviously not within the tender process.** For the minister to use this defence is stupid. The workers have always maintained there was secrecy surrounding the arrival in Derby of the large quantity of unmarked drums. This is what they have wanted investigated, not the tender process that supplied the standard production 245T. It is generally believed among the former workers that the offending toxic waste was taken off the hands of the manufacturer by an APB official as a favour or for financial consideration to be disposed of out of sight, out of mind by the hapless workers. **Despite records of its manufacture, there is no record of how the failed product was disposed**)*

Question: How were the drums or containers labelled?

The respondents were asked whether or not the drums or containers of spray were labelled. Only 22% of the former APB workers said that drums and containers were labelled. **49% said there were no labels** and 29% could not recall whether or not there were labels.

*(WN: Some operators may recall labels from the correctly supplied 245T. Also in other interviews researched, operators have been asked if the drums had labels and they replied "Yes", but go on further to say that it was only a skull and cross bone marking.)*

***Vietnam Veterans:***

In a study of Vietnam Veterans who claimed exposure to Agent Orange, the symptoms reported by 50% or more of the sample included: rash, aggravation of rash by sunlight, joint pain and stiffness, extreme fatigue, tingling, numbness, dizziness, depression, nausea, diarrhoea and blurred vision. The group was described generally as being chronically ill. (Booth G. 1979).

*(WN: Theses are the same symptoms that many of the affected workers complain. Our research on Agent Orange dioxin content indicates that for many years the generally accepted content has ranged upward from1.8ppm to 3ppm. More recent research showed evidence of some drums being up to 20 ppm, therefore today the accepted dioxin contamination level is 13ppm. **The Sample as tested relevant to black treacle-like substance used by the APB analysed at 26ppm).***

**Standing Committee on Public Administration: Chemical Spraying in the Kimberley Region:**

In 1999 the Legislative Councils Standing Committee on Public Administration, **chaired by the Hon. Kim Chance** began gathering information regarding complaints over the spraying of herbicides by former APB employees.
**Submissions to the Committee were received from former APB supervisory staff** from both Derby and Kununurra. These submissions describe a number of issues regarding the spraying program. The following comments were made.
*Approximately 25 drums of the chemical 2,4,5-T were stored at the then recently constructed APB security storage compound.* ***The drums were unmarked in 200 litre used fuel drums, the drums were of various colours, silver, green and rusty brown.*** *Some were in poor condition and were leaking chemicals. These leaking drums were decanted into other 200 litre drums beneath which the floor was corroded where the chemical had leaked.*
***There were no labels or safety instructions or hazardous poison signs on any drums*** *containing 2,4,5-T.* ***There was enough chemical to last the West Kimberley region spraying program 10-15 years*** *at the current rate of use spraying Mesquite, Parkinsonia and Noogoora Burr.*
This staff person transported a 200 litre drum to both Kununurra and Port Hedland. In Port Hedland **he witnessed an APB operator siphoning the spray by mouth through a hose into his knapsack spray unit because the drum hand pump was broken.**
He said that **APB operators in the West Kimberley regions did not wear safety gear** although they had respirators. **They were spraying in thongs, shorts and t-shirts. A video showing operators in the Kimberley region showed operators spraying without safety or protective clothing. The video was shown frequently by the APB for the training** of officers at the Forrestfield Training School. It was also used for educational purposes at schools. He personally used the video at one school.
He said that he expressed grave concern over the health hazard using 2,4,5-T together with District Officers and operations staff to the APB at Head Office over some considerable time.
***The APB issued safety equipment including heavy duty overalls, rubber boots and complete head masks. This safety gear was totally useless because of the extreme heat which sometimes reached 42°. The safety gear could not be used.***
During the 4 year period that he was with the APB in the Kimberley**,** ***there were no manufacturers labels indicating poisonous or hazardous chemicals. There were no safety or health markings on any drums or containers*** *of 2,4,5-T.* **Neither did he observe any manufacturers labels on drums** of 2,4,5-T at any other APB operation centres that he visited in the North of Western Australia.
*At no time did the APB at Head Office in Perth instruct the APB operators to discontinue spraying 2,4,5-T* during his four years**. In fact he said the staff were encouraged to continue spraying, although adequate protective clothing could not be used.** *One senior agricultural* ***officer in Perth stated that 2,4,5-T was so safe you could drink it.***
The Honorable Tom Stephens wrote to the Committee relaying the submission of one of his constituents who had been employed by the APB in the Kimberley. **He (the constituent) submitted that the APB was totally negligent** in the administration of the weed eradication program for the following reasons:
*1. There were minimal to no instructions given to APB employees regarding*

*the safe handling of pesticides.*
*2. There was no adequate health or medical supervision or care given to the APB employees in relation to the use of pesticides.*
*3. There was negligible information provided on the environmental protection aspects of the pesticides and what residual effects the use of these pesticides would have.*
*4. There was a haphazard approach to the safe disposal of empty pesticide drums.*
**The proceedings of the Standing Committee on Public Administration were not completed.**
(WN: *The fact that the proceeding of this committee was never completed is indicative and typical of WA government's mode of operation.* ***When information is received contrary to the interests of the government, the standard procedure is to pretend it does not exist****. Also please note that the* ***very important submissions*** *from the local APB supervisory staff quoted here has effectively been discredited by the lack of inclusion in the "official" two-way argument.*
***The Chair of the committee who received these submissions is the current Minister of Agriculture.*** *By deliberate omission of these arguments and the continuity of evidence supporting the supply of unregulated dioxin from the public debate, Westralia.Net believes he is engaged in highly questionable conduct.)*

**On Safety Training and Protective Equipment:**
In response to the question of whether or not chemical safety training was provided, 68 **(88%) of the former APB workers said no training was provided.**
Comments were made that towards the **latter part of the 1975-1985 period**, some training was provided. Nine (12%) of the 77 APB workers reported receiving training.
Regarding the period 1982-1984, **one** worker said that he was told.

Regarding personal protective equipment, 45 of former APB workers **(58%) said that they were initially not provided with any personal protective equipment**. 32 (42%) said they received some equipment. A number of comments were made about protective equipment. It was said generally that equipment was not provided in the earlier years in 1975-1985 period but started to be provided from approximately 1982 or 1983 onwards.
**The equipment provided was very limited and**
***'you had to fight for what was there'.***
For example one person said that
***'there were four overalls for 10 blokes and only 1 pair of overalls for 3 or 4 days'.***
The equipment which was provided included overalls, leather gloves, rubber gloves for pouring and mixing, paper masks, respirators and Wellington boots. Full face masks were also reported to have been provided. Most people said the equipment **was not usable** and some indicated they may have worn it for a couple of days. Gloves became wet with the spray and sweat and were rendered slippery and not wearable. **Replacement filters on the respirators were said not to be provided and the filters never worked**.
Other comments regarding the PPE included:
'*It didn't fit, it was too hot.*
***The masks clogged up in ½ an hour and the PPE was useless.***
*They gave us leather gloves with cotton backing, they were useless.*
***Overalls provided no protection when soaked.***
*The gloves had holes in them.*
***Cotton gloves were soaked.***
*I wore a glass shield sometimes but it provided no protection.*
*Initially there was no protective equipment but in 1982 overalls were provided and respirators provided in 1983.'*
*'There was a lack of safety equipment.*
***There were only four respirators provided for a crew of 10.***
*No changes of gloves were provided and no replacement canisters for respirators.*

*No overalls were provided'.*

Some people explained the **provision of PPE as a response to the workers '*making a stink'.*** 79% wore short sleeves at least part of the time. 47% wore short pants some of the time or all the time. 65% indicated they wore long pants at least some of the time. Approximately 25% of the operators indicated that they had worn a mask or respirator and gloves on some occasions. **Only 2 of the operators (3%) said they had worn eye protection.**

In response to being asked the question on comments or **information regarding toxicity being provided by the APB**, 62 operators **(81%) said that no information was provided.** One person could not recall. 18% said they received some information regarding the toxicity, however these comments were highly variable. Most operators said that the APB told them nothing of the toxicity and **a number of people made comments such as *'they kept us it the dark, they told us nothing about it, there was no way the APB commented or informed us of the toxicity of the spray'.***
Other comments included *'its not going to harm you, its 2,4,5-T.* ***It's not poison, its harmless.*** Then a number of operators reported being told such things as ***'it's so weak you can drink it if you run out of water'****. 'You could wash in it but don't drink it'.*

Some comments made by the APB were along the lines of *'it's not dangerous if used according to the directions'* **but operators said that directions and manufacturers instructions were not available.**

**And From Our Citizens, Poisoned While Employees of the WA government:**
*'Why was it* ***nearly exclusively Aborigines*** *they employed while now it is virtually the opposite. I don't think you will find any Aborigines in the APB now.* ***I think we were guinea pigs. They took advantage of Aboriginal people.*** *In 1995 or 1996, I was the only Aboriginal among 48 APB employees. The gear looked liked aliens. They were all decked out compared with us then'.*
*Aboriginals have been unable to get these jobs for 10 years since they changed the chemicals;*
***' They used us as guinea pigs. They didn't explain the chemicals. There was no explanation of health effects or its danger. No protective equipment at all. Why wasn't there protective equipment?. Why was the information hidden?*** *I'm concerned over future health for my kids and myself. This may have put a nail into my kids' coffin and for me. We were just sent out into the bush to spray these weeds'.*
*' The woman who washed my clothes died. They didn't tell me how dangerous it was. We asked no questions. The money was good. We had no work. We didn't know anything about the chemicals until the end. They were racist'.*
*the chemicals; there has been discrimination against race. I feel we were guinea pigs.* ***Once the chemical dried up, we dried up.*** *Racism was rife'.*
***'I'm concerned over not being informed.*** *'There it is in the corner, mix it and go bush', that's all we were told. There was a lack of safety, a lack of communication about safety and how to dispose of the chemical. You practically slept in it. You took it home with you. They didn't provide you with work clothes. Then my wife refused to wash my gear because it stunk. The swag smelt. Eating utensils were probably contaminated. The smallest thing you can think about was*

*affected. You inhaled it when you smoked. The chemical was all in the camp'.*
*'I want to know my future health risk of getting ill or having cancer. I am very concerned regarding my daughter's future as she was conceived during the spraying. I am also concerned for my three grandchildren and the genetic consequences. I am concerned for my wife's health who did the washing. Work conditions were appalling to say the least.* ***No bathing facilities.***
***District Officers were in hotels, we were pigs in the bush'.***
*'They kept it so quiet. Why didn't they come out and say it was Agent Orange?*
*'The spray would drip into the river and trees would fall into the river contaminating the water. Our camp was downstream so contaminated water flowed past the camp. That night we would wash in the river and drink the water. We were not told what the chemical might do to you now or later'.*
***' Why was it not looked at sooner? Where did the poison come from? Why weren't the APB responsible and take a duty of care for workers? They never observed their duty of care. Why have they said it didn't happen when it obviously has. They must have known about it.*** *There is a lot of frustration in not knowing these things'.*
***I feel we have been dealt a death penalty.*** *We have been shafted. Everybody has been* ***shafted as opposed to the Government saying we will help you and get you treatment. Everybody gets fobbed off'.***
*'My mother died after washing clothes. I am concerned over death'.*
***A lot of people died leaving kids without fathers.*** *How long will it take before it takes its course?'*
***'If I had known what I was using, I would never have done the job.***
*I exposed myself out of ignorance.*
***No information was provided on what we were doing.*** *We should have been informed. Why weren't we told of the toxicity?'.*
***'The APB has been unfair to Aborigines' The APB took advantage of illiteracy of the workers.***
We were kept in the dark'.
***'Why were we told we could drink it?.***
*Why was* ***I told by the Training Officer that respirators were not needed*** *when basal barking with 2,4,5-T?*
*I feel deceived and lied to.*
*We have been shafted'.*
*'It makes one feel unhappy because* ***they knew but we didn't.***
*The trucks with chemicals were not allowed onto the properties indicating they (Station owners) knew the chemicals were dangerous.*
***The APB knew we were being exposed and they had no regard for our safety or wellbeing.***

***Why weren't the APB responsible and taking a duty of care for workers?***

(WN: Yes, why indeed? ..And also the government officers today who try to defeat justice? The above concerns are the human face of this despicable part of history. At the time of writing the WA government was offering only former APB workers with cancer compensation. How much? …$5,000 for their slow death by deceit.)

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## Conclusion by Westralia.Net

There are many transcripts such as the above samples quoted in the public domain. There have been many official interviews with former workers with similar accounts and descriptions, yet the WA government and agricultural minister has selectively chosen to ignore all this evidence in favour of documentation about a different substance.

The medical research of the Armstrong inquiry has been based on standard production 245T. There are no doubt risks associated with even the regulated dioxin content of the standard herbicide.
In fact it should be noted that Armstrong's recommendation of accepting compensation claims for cancer associated with the herbicide exposure are based on standard production 245T. The toxic waste the workers believed they were provided analysed at up to **2600 times** the allowable limit of dioxin contamination.

Yet it is clear from the very first complaints from the workers over twenty years ago, that their main concern was the provision of the unknown substance supplied to them illegally contrary to the Poisons Act and their related illnesses and subsequent deaths of colleagues caused by what was an unknown substance.

The same eyewitness accounts are repeated by many former APB workers; **treacle type material of dark inconsistent colour, nothing like the regular production 245T that is of regular physical consistency and colour like motor oil.**

To compound the problem of being supplied this toxic waste, the workers were given no or insufficient training, and very little or no personal safety equipment. In this regard the WA government has chosen to defend this negligence by indicating that it was along time ago, and accepted safety practices were lax.
This is not true. By the mid 1970's, personal safety protection and occupational hazard awareness were paramount throughout WA industry.
The fact that the WA government chose otherwise for its own workforce is no defence.

Even if the substance was production 245T, it should not be applied allowing skin contact or above 25 degrees C. This is hardly appropriate in the Kimberley where the ambient temperature is frequently above the mid thirties and into the forties.

The WA government refuses to accept responsibility for what the above report, together with what many eyewitness accounts make clear, that the material in question was not regular 245T.
The WA government and the minister are fabricating a red herring with the argument of:
*However, it would have been equally valid to conclude that there is no definitive evidence that exposure to unregulated levels of dioxin occurred. In fact, the information available appears to suggest that such an event was unlikely based on all the testing undertaken at the time.*
*If such exposure did occur, it would have arisen from the use in the spraying program of batches of 2,4,5-T not complying with the tender specifications in respect of levels of the contaminant TCDD.*

You will note that even this response is self-incriminating.
Firstly, it is easy to demonstrate from the Ingraham report that the "***substance tested at the time***" bears no resemblance to the offending material that the former workers complain. Compare the workers accounts with the manufacturer's own description of correct production 245T.
**The documented tests referred to are simply not relevant.**

We believe it is fraudulent to attempt to present otherwise, and false to achieve this as an official conclusion to the public.
Furthermore, the WA government continues by saying that if exposure to unregulated dioxin did occur, it is due to the supply of 245T ***not complying with the tender specifications***.
This is self-evident and obvious, and raises the question that the workers and surviving families have been asking for over 20 years;
**Why did the WA government supply its employees with this toxic waste to be applied using totally unsafe practices?**
It was the WA government's legal responsibility to ensure the herbicide supplied complied with tender specifications. On the basis of breach of labelling and marking laws alone we already know the supply was outside tender specifications. There are more than enough eyewitnesses to confirm this criminal activity.
Yet the WA government still fails to admit responsibility for the killing (by definition of its own criminal code) and harming our citizens.

The whole debacle of this alleged concealment that has taken place before and since the completion of Professor Andrew Harper's report requires a thorough investigation. Westralia.Net believes officers of the WA government have broken laws, and this is entirely unacceptable. Too many of our citizens have been killed by this deceit.

It is our belief that the Agriculture Minister and WA government have engaged in misleading and deceptive conduct in an effort to avoid moral, legal, and honourable responsibilities towards former workers and our fellow Westralian citizens.

**That is absolutely odious**.

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