



## **TETRACHLOROBENZYL TOLUENES**

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## **1. INTRODUCTION**

### **1.1 Nomination reason**

Tetrachlorobenzyltoluenes (TCBTs) were nominated as a group of chemicals during the National Industrial Chemical Notification and Assessment Scheme's (NICNAS) call for nomination of chemicals of concern in February 1999.

The reason for nomination and selection of these chemicals for further work included concerns surrounding their potential to persist and bioaccumulate in the environment.

An initial call for information under Section 48 of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) was published for TCBTs including two specific group members, Ugilec 141 (CAS No. 76253-60-6) and Ugilec 121 (CAS No. not assigned) in August 1999. No information was received by NICNAS as a result of this and a subsequent call for information was published in the *Chemical Gazette* of January 2002.

### **1.2 Objectives of report**

The objectives are to identify the quantities of TCBTs or TCBT products imported into Australia, quantities manufactured and the uses of TCBT and the products containing TCBTs. Amounts of TCBTs produced and/or released as by-products of processing and/or manufacture and uses were also investigated.

In addition to the uses and amounts, the report includes information on the physico-chemical characteristics of these chemicals and overseas regulatory initiatives pertaining to these chemicals.

## **2. SEARCH STRATEGY**

### **2.1 Industry**

In accordance with Section 48 of the Act, a notice was published in the *Chemical Gazette* of January 2002. The notice was directed at all persons who have manufactured or imported one or more of the chemicals or products containing the listed chemicals since August 1999. The information required in the Section 48 notice was:

- quantities imported and/or manufactured;
- amounts produced and/or released as by-products of processing and/or manufacture;
- products imported containing the chemicals and quantities of the chemicals in the products;
- uses of the chemicals or the products containing the chemicals.

It also encouraged any other persons with information on these chemicals including users, past importers or manufacturers to provide this information.

A total of 27 companies identified as being potentially involved with this group of chemicals were contacted. The companies are listed in Appendix 1.

Potential manufacturers and importers of these chemicals were identified from a search of:

- overseas use information;
- published literature (e.g. books, manuals and encyclopaedias);
- NICNAS Company Registration Database (NICNAS, 2002); and
- web site sources such as MSDSOnline (MSDSOnline, 2002), SciFinder (SciFinder, 2000) and TOMES Plus (TOMES Plus, 2002).

Throughout this process if information became available on a particular use, or industry that may use, or be associated with the chemical, then further focused searching was conducted in that specific area.

## **2.2 Organisations**

Organisations contacted included non-government organisations (NGO) such as industry associations and unions (Appendix 2) and government agencies at the Federal, State and Territorial levels.

NGOs were identified from the Directory of Australian Associations March 2002-July 2002 (Current Contents, 2002).

In addition, agencies such as the United States Environmental Protection Agency (US EPA) and the European Chemicals Bureau were contacted for likely use information.

## **2.3 Literature sources**

Chemical identity searching was conducted using a variety of databases to identify other chemicals within this group. SciFinder (2000) was used to identify chemicals with the same molecular structure and chemical dictionaries and encyclopaedias were used to further identify the specific chemicals constituents within the group of TCBTs.

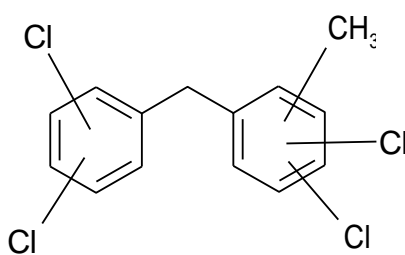
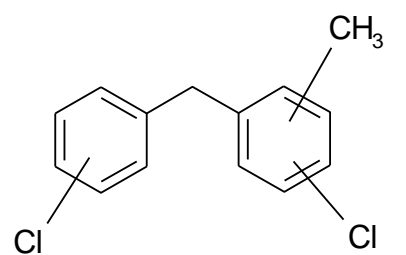
## **3. CHEMICAL IDENTITY**

Tetrachlorobenzyltoluenes (TCBTs) are a group of 96 individual isomers of dichlorobenzylchlorotoluene (Ehmann and Ballschmiter, 1989). Two groups of TCBTs, Ugilec 141 and Ugilec 121, were available for commercial use.

Ugilec 141 consists of a mixture of 70 isomers of TCBTs (Ehmann and Ballschmiter, 1989; Kramer *et.al.* 2000). Ugilec 121 and Ugilec C21 contain mixtures of dichlorobenzyltoluenes (DCBT) and have identical properties but different uses.

The chemical identities of Ugilec 141, 121 and C21 are outlined in Table 1.

**Table 1: Chemical identity of Ugilec 141 and Ugilec 121 (Ugilec C21)**  
 (Adapted from Herrmann, 2002)

Trade Name	Ugilec 141	Ugilec 121; Ugilec C 21 (for use in capacitors)
Synonyms	Monomethyl-tetrachloro-diphenyl methane, Dichloro [(dichlorophenyl)methyl] methylbenzene	Monomethyl-dichloro-diphenyl methane Dichlorobenzyltoluene mixture of isomers
CAS No	76253-60-6	none
EINECS Number	278-404-3	400-140-6
Molecular formula	$C_{14}H_{12}Cl_4$	$C_{14}H_{12}Cl_2$
Molecular structure		

## 4. CHEMICAL AND PHYSICAL PROPERTIES

Table 2 contains the chemical properties of Ugilec 141 and 121.

**Table 2: Chemical properties of Ugilec 141 and 121**

Trade Name	Ugilec 141	Ugilec 121
CAS No	76253-60-6	none
Molecular weight	320.05	251.16
Water solubility [ $\mu\text{g/L}$ ]	5 at 20 °C	< 1 at 20 °C
Vapour pressure [Pa] at 20 °C	0.05	<10
Log Kow (estimated) (Octanol/Water partition coefficient)	7.14	5.85
Log BCF (estimated) (Bioconcentration factor)	3.8	3.81
Density	Not available	1.25

(Adapted from Herrmann, 2002)

## 5. INTERNATIONAL PERSPECTIVES

### 5.1 Uses and emissions

Ugilec 141 and 121 were approved for manufacture in France pre 1981 and 1984 respectively as substitutes for polychlorinated biphenyls (PCBs). They share similar physico-chemical properties with PCBs and were applied for similar purposes, such as dielectric fluids in capacitors and transformers and as hydraulic fluids in underground coalmines (Herrmann, 2002).

Approximately 1500 tons per year of Ugilec 141 has been used as a hydraulic fluid in the mining industry in Germany since 1980 [Poppe et al. (1988) as cited in Van den Berg and Seinen, 2001]. According to Herrmann (2002) Ugilec 141 was used in Spain after the banning of PCBs, mainly to compensate for losses of dielectric fluids in operating transformers. It was also used in transformers installed in Monaco pre 1990.

Ugilec C21 was designed for specific use in capacitors and transformers as a dielectric fluid.

### 5.2 International initiatives

#### European Union

The United Nations Economic Commission for Europe (UN ECE) established the Convention on Long Range Transboundary Air Pollution (LRTAP) in June 1998. The

LRTAP's Protocol on Persistent Organic Pollutants (POPs) lists 16 substances that have been singled out according to agreed risk criteria. The ultimate objective is to eliminate any discharges, emissions and losses of POPs. The Protocol bans the production and use of some products while others are scheduled for elimination or severe restriction in coming years (UN ECE, 1998).

Under the LRTAP protocol, parties involved with the UN ECE have agreed to reassess the production and use of Ugilecs by 31 December 2004. A working draft report contains the results of a survey carried out in this region (Herrmann, 2002). The survey was conducted as part of the assessment of production and use of Ugilecs. The report states that Ugilec production either ceased or had never occurred in the responding UN ECE countries. France was the only manufacturer of Ugilecs. Ugilec 141 entered the market in 1981 and Ugilec 121 was approved for marketing in 1984 but was voluntarily removed from the market by the notifying company.

In 1991 the European Union Council Directive 91/339/EEC prohibited the marketing and use of both Ugilecs. These measures were applied to Ugilec 121 to prevent reintroduction of products containing the chemical at a future date. For Ugilec 141, the marketing and use of this substance and preparations and products containing it were prohibited from 18<sup>th</sup> of June 1994. However by way of exemption, the provision did not apply to machinery already in service on 18 June 1994 until disposal. The Directive prohibited the second-hand sale of products containing Ugilecs after that date. The Directive also gave the authority to each territory to prohibit the use of Ugilec containing plant or machinery on or after the 18<sup>th</sup> of June 1994 (76/769/EEC, 1991).

In the EU, PCBs and PCB-like wastes and equipment containing such material are subject to strict regimes for hazardous wastes. Council Directive 91/339/EEC (1991) relates to the disposal of PCBs and PCB like wastes and equipment containing such material. The disposal requirements set out in this Directive also apply to both Ugilecs. This Directive states that such material shall be disposed as soon as possible, but not later than 2010.

Council Directive 96/59/EC obliges member states to:

- compile inventories of equipment containing PCB and of mixtures containing more than 0.005% PCB in excess of 5 litres;
- prohibit separation of PCBs from other substances for the purpose of re-using the PCBs;
- prohibit the topping up of transformers with PCBs;
- ensure that transformers containing PCBs are to be used only if they are in good working order; and
- safely remove PCBs from transformers containing more than 0.05% PCBs by weight (or mixtures with PCBs).

With respect to the safe disposal of PCBs the same Directive contains obligations to:

- destroy waste PCBs as soon as possible, but not later than 2010;
- prohibit incineration of PCBs at sea; and
- use specified methods of disposal.

Council Directive 94/67/EC applies to the incineration of Ugilec 141 and 121. This Directive requires notification to the competent authority the quantity, origin and nature of the substances delivered to them (Herrmann, 2002).

### **United Kingdom (UK)**

On the 31<sup>st</sup> of July 1992 UK's *Environmental Protection (Controls on Injurious Substances) (No. 2) Regulations 1992* came into force. This legislation is very similar to the EU Council Directive 91/339/EEC and prohibits the marketing or use of Ugilec 141 unless already in use and the outright banning of Ugilec 121 except for research, development and analytical purposes from 18 June 1994.

### **Germany**

In Germany, the use, manufacture and processing of Ugilecs 141 and 121 was prohibited in 1993. Ugilec 141 and Ugilec 121 are also classified as hazardous waste and requires supervision of disposal under Section 3 of the German Waste Disposal Act.

### **United States (US)**

Ugilec or Ugilec constituents have not been approved for use or production within the US. Ugilec are not listed on the *Toxic Substances Control Act (TSCA)* Section 8b Chemical Substances Inventory of existing industrial chemical in commerce within the US.

### **Canada**

Ugilec or Ugilec constituents have not been approved for use or production in Canada.

### **United Nations**

Ugilec 141 and 121 are not listed in the annexes to the Basel Convention. The Basel Convention aims to control the transboundary movement of hazardous wastes, promote their environmentally sound management and disposal and prevent illegal waste trafficking.

## **6. AUSTRALIAN PERSPECTIVES**

### **6.1 Uses and emissions**

Fourteen companies (45%) and 2 associations/unions who were sent the Section 48 notice responded to the call for information. In addition, 10 further companies responded directly to the Section 48 call for information. The responses indicated that Ugilec 141 and Ugilec 121 are not being imported into or manufactured in Australia.

The Australian division of the French company who originally produced Ugilec 141 and 121 in the mid to late 1980's confirmed that Ugilec 141 or 121 were not imported to Australia.

M.I.M Holdings Limited, Western Mining Corp. Ltd and Pasminco Hobart Smelter reported that Ugilec 141 or Ugilec 121 was not a component of the hydraulic fluids used in the machinery at their sites.

In October 1983, Ugilec C21 used in capacitors and transformers as a dielectric fluid was notified on the Interim Notification Scheme administered by Environment Australia. This notification was later withdrawn in November 1984. The company advised that about 100



tonnes/year of Ugilec C21 was imported from 1982 to 1984 inclusive, for end use as a dielectric fluid in capacitors. The used fluid was disposed of via incineration. No further importation of Ugilec C21 occurred after 1985.

No further information was received on importation or use of Ugilec 141 or 121 in Australia.

## 6.2 Regulatory controls

TCBTs are not specifically listed in the:

- Australian Inventory of Chemical Substances (AICS), an inventory of chemicals used within Australia (AICS, 1999);
- National Occupational Health and Safety Commission's *List of Designated Hazardous Substances* (NOHSC, 1999).
- *Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP)* (NDPSC, 2001); and
- Australian Code for the Transport of Dangerous Goods by Road or Rail (FORS, 1998).

No specific tariff code was identified under the Australian Customs Service tariff code system for these specific chemicals or the TCBT group of chemicals.

Regulation 4AB of the *Customs (Prohibited Imports) Regulations 1956* prohibits import of PCBs and other chlorinated biphenyls and goods containing these, without the written consent of the Minister for Justice and Customs. In practice, where a request to import prohibited PCBs is received, the Australian Customs Service will seek advice from EA and NICNAS. A national PCB Management Plan exists in Australia but does not include Ugilec 141, 121 or C21. The Australian and New Zealand Environment and Conservation Council (ANZECC) prepared the Plan in 1996. The aims of the PCB Management Plan are the phasing out, disposal and destruction of PCBs within 13 years. The PCB Management Plan also includes a monitoring and sampling program to show trends in the environment and population of PCBs. The EU Directive 96/59/EC indicated that among others, Ugilecs were used in topping up of transformers. Because Ugilec C21 was used as a PCB replacement in many capacitors within Australia, it is likely that capacitors will contain both Ugilec C21 and PCBs as the dielectric fluids. Therefore the controls in place for PCBs, particularly for capacitor fluid PCBs, may control further environmental or human exposure to the Ugilec C21.

## 7. CONCLUSIONS

Ugilec 141, Ugilec 121 and Ugilec C21 are not listed in the AICS indicating that they were not commercially available in Australia from 1977 to 1990. Responses to the January 2002 call for information indicated that they are not being imported or used at present.

Manufacture of these chemicals in the EU was prohibited from mid 1994 onwards. From the information obtained it shows that France was the only country to manufacture these chemicals. Commercial production of Ugilec 121 never occurred and sale of Ugilec 141 has ceased.

Because of the restrictions imposed in 1994 on the manufacture, sale and use of these chemicals internationally it is very likely that products containing these chemicals are not coming into Australia currently.

The *Customs (Prohibited Imports) Regulations* 1956 prohibits import of PCBs and PCB containing products (except for research purposes).

## **8. FOLLOW-UP ACTION**

There is currently no need for further action on TCBTs within Australia. This is based on the absence of Ugilec 141, Ugilec 121 and Ugilec C21 from the AICS and the only identified Australian importer confirmed that importation of Ugilec C21 has not occurred since 1985.

## **APPENDIX 1: List of Companies Contacted**

Alpha Chemicals (Australia) Pty Ltd

AS Harrison & Co Pty Ltd

Atofina Australia

Bostik Findlay Australia Pty Ltd

Bribros Australia Pty Ltd

Caltex Australia Limited

Chemlube Company Pty Ltd

Chem-Supply Pty Ltd

Ciba Speciality Chemicals Pty Ltd

Cognis Australia Pty Ltd

Dow Chemicals (Australia) Ltd

Du Pont (Australia) Ltd

Fuchs Australia Pty Ltd

HCA Colours Australia P/L

Houghton Australia Pty Ltd

Huntsman Corporation Australia Pty

International Chemicals Ltd

International Sales and Marketing

Lubrication Engineers Pty Ltd

Lubrizol Australia

M.I.M Holdings Limited

Nufarm Coogee Pty Ltd

Oilchem Pty Ltd

Orica Australia Pty Ltd

Pasminco Hobart Smelter

Pennzoil Products Australia Company

Recochem Incorporated

Shoalhaven Mill

Sigma Aldrich Australia Pty Ltd

Swift and Company Limited

Western Mining Corp. Ltd

## **APPENDIX 2: List of Associations and Unions contacted**

### **Associations**

AMIRA International Australian Mineral Industries Research Association Limited

Australian Consumer and Specialty Products Association

Australian Mines and Metals Association

Institute of Electrical Inspectors

Minerals Council of Australia

New South Wales Minerals Council Ltd

PACIA – Plastics And Chemicals Industries Association

Waste Contractors & Recyclers Association, NSW

### **Unions**

Australian Council of Trade Unions

Australian Manufacturing Workers Union

Communications Electrical and Plumbing Union - Electrical Division

Construction Forestry Mining Energy Union - Construction and General

## REFERENCES

91/339/EEC (1991) Council Directive 91/339/EEC of 18 June 1991 amending for the 11th time Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations. Document 391L0339([http://europa.eu.int/eur-lex/en/lif/dat/1991/en\\_391L0339.html](http://europa.eu.int/eur-lex/en/lif/dat/1991/en_391L0339.html)) . Accessed June 2002.

96/59/EC (1996). Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyl's and the polychlorinated terphenyls (PCB/PCT).

AICS (1999) Australian Inventory of Chemical Substances (AICS). National Industrial Chemical Notification and Assessment Scheme (CD ROM Issue 2).

Current Contents (2002) Directory of Australian Associations. March 2002-July 2002 **43**. Melbourne, Crown Content, p. 945.

Ehmann J & Ballschmiter K (1989) Isomer-specific determination of tetrachlorobenzyltoluenes (TCBT) in the technical mixture Ugilec 141 by capillary gas chromatography. Fresenius' Z Anal Chem., **332**(8): 904-11.

Federal Office of Road Safety (1998) Australian code for the transport of dangerous goods by road and rail (ADG Code), 6th edition. Canberra, AGPS.

Herrmann M (2002) Information dossier on production and use of UGILEC in the UNECE Region. For comment and review by the UN ECE ad hoc Expert Group on POP's, March 2002 <[http://www.unece.org/env/popsxg/dossier\\_ugilec\\_drf2.rtf](http://www.unece.org/env/popsxg/dossier_ugilec_drf2.rtf)> (Working Draft 2), Accessed April 2002.

Kramer HJ, Drenth HJ, & Olinga P.(2000) Identification of cytochrome P450 enzymes involved in the biotransformation of PCB 77, PCB 136 and Ugilec 141 isomers using human hepatic microsomes. Organohalogen Compounds, **49**: 299-302.

MSDSOnline (2002) <<http://www.msdsonline.com/Home/>>, Accessed April 2002.

NDPSC (National Drugs and Poisons Schedule Committee) (2001) Standard for the Uniform Scheduling of Drugs and Poisons., **16** (Amendment 1-3). Woden, A.C.T., Commonwealth Department of Health and Aged Care.

NICNAS (2002) National Industrial Chemical Notification and Assessment Scheme Company Registration Database.

NOHSC (National Occupational Health and Safety Commission) (1999) Designated hazardous substances list, <<http://www.nohsc.gov.au/OHSInformation/Databases/HazardousSubstances/>>, Accessed April 2002.

Poppe A, Alberti J, Friege H, & Roenefahrt B (1988) Umweltgefaehr durch chlorierte diphenylmethane (Ugilec 141), *Vom Wasser*, **70**, 33-42.

SciFinder (2000) American Chemical Society.

TOMES Plus (2002) Klasco RK, Gelman CR, Heitland G (Eds): TOMES® Plus System. MICROMEDEX, Greenwood Village, Colorado. Accessed via Thomson MICROMEDEX Corporate Solutions on the Internet Systems <http://csi.micromedex.com/>. Accessed April 2002.

UN ECE (United Nations Economic Commission for Europe) (1998) Protocol to the 1997 convention on long-range transboundary air pollution on persistent organic pollutants. Annex II - substances scheduled for restrictions on use <<http://www.unece.org/env/lrtap/protocol/98pop.htm>>, Accessed April 2002.

Van den Berg M & Seinen W (2001). Comparative toxicokinetics of TetraChloroBenzyIToluenes (TCBTs) and PolyChloroBiphenyls (PCB's). Netherlands, Research Institute of Toxicology (RITOX).