



# **Management Plan for Polychlorinated Biphenyls (PCBs)**

**August 2002**





# **Management Plan for Polychlorinated Biphenyls (PCBs)**

**August 2002**

**Environmental Protection Agency**  
**An Gníomhaireacht um Chaomhnú Comhshaoil**  
P.O. Box 3000, Johnstown Castle Estate, County Wexford, Ireland  
Telephone : 053-60600      Fax : 053-60699  
Email: [info@epa.ie](mailto:info@epa.ie)      Website: <http://www.epa.ie>

© Environmental Protection Agency 2002

Parts of this publication may be reproduced without further permission, provided the source is acknowledged.

**Management Plan for Polychlorinated Biphenyls (PCBs)**

**August 2002**

Published by the Environmental Protection Agency, Ireland.

This document does not purport to be and should not be considered a legal interpretation of the legislation referred to herein.

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. Neither the Environmental Protection Agency nor the author(s) accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication.

Authors: Brian Meaney and Gerry Carty.

ISBN 1-84095-095-1

Price €7

08/02/2000

# CONTENTS

<b>Definitions</b> .....	<b>7</b>
<b>Acknowledgements</b> .....	<b>8</b>
<b>Summary</b> .....	<b>9</b>
<b>1. Introduction to PCBs</b> .....	<b>11</b>
<b>2. Legislation and legal requirements</b> .....	<b>13</b>
<b>3. Notification of PCB holdings</b> .....	<b>14</b>
3.1. Notifying the EPA.....	14
3.2. Notification fee and cost recovery.....	14
3.3. Notification form.....	15
<b>4. Quantities arising and likely sources</b> .....	<b>16</b>
4.1. Inventory of PCB holdings.....	16
4.2. Estimate of non-inventoried holdings.....	17
<b>5. Identification of PCBs and contaminated equipment</b> .....	<b>19</b>
5.1. Identification of equipment.....	19
5.2. Testing and analysis.....	20
<b>6. Labelling, in-use management and decontamination of PCBs</b> .....	<b>22</b>
6.1. Labelling of PCBs and PCB-contaminated equipment.....	22
6.2. In-use management of PCB-contaminated equipment.....	22
6.3. Decontamination of PCB-contaminated equipment.....	22
6.4. Labelling of decontaminated equipment.....	23
6.5. Code of Practice for in-use management of PCBs.....	23
<b>7. Collection and storage of PCBs and PCB-contaminated equipment</b> .....	<b>24</b>
7.1. General provisions.....	24
7.2. Large holdings.....	25
7.3. Small holdings.....	25
<b>8. Incentives</b> .....	<b>27</b>
<b>9. Information and awareness</b> .....	<b>28</b>
<b>Appendix A: Background information on PCBs uses and likely pollution pathways</b> .....	<b>29</b>

<b>Appendix B: Text of the legislation .....</b>	<b>32</b>
<b>Appendix C: List of PCB trade names .....</b>	<b>36</b>
<b>Appendix D: List of transformer trade names.....</b>	<b>40</b>
<b>Appendix E: List of capacitor trade names .....</b>	<b>41</b>
<b>Appendix F: List of contractors .....</b>	<b>43</b>
<b>Appendix G: List of testing laboratories .....</b>	<b>44</b>
<b>Standard reporting form for PCB holdings .....</b>	<b>45</b>

## Definitions

PCB	Polychlorinated biphenyls (see section 1 for legal definition)
PCT	Polychlorinated terphenyls (see section 1 for legal definition)
EPA	Environmental Protection Agency
Contaminated equipment	Any item of equipment (e.g. transformer, capacitor, etc.) which contains PCBs at a concentration greater than 0.005% by weight (of liquid) and which has not been decontaminated.
Transformer	A device that transfers an alternating current from one circuit to one or more other circuits, usually with a change of voltage. The unit is generally filled with a dielectric fluid, which may contain PCBs.
Capacitor	A device for accumulating and holding an electric charge. A capacitor comprises two conducting surfaces separated by a dielectric fluid, which may contain PCBs. Also referred to as a condenser.
Power factor correction unit	A specific form of large capacitor, generally located in close proximity to a site's transformer or power board.
Lighting ballast	A device contained within a light fitting designed to maintain the electric current.

## **Acknowledgements**

The EPA would like to acknowledge the work carried out by URS Dames & Moore, Dublin, in the preparation of a *Final Report on the Management of PCBs in Ireland* which provided information on the estimated quantities of PCBs and made recommendations for the management of PCBs in Ireland.

The EPA would also like to acknowledge the assistance of Dr. Brian Leech of the Department of the Environment and Local Government in the preparation of this *Management Plan for Polychlorinated Biphenyls (PCBs)*.

## Summary

Council Directive 96/59/EC on polychlorinated biphenyls and polychlorinated terphenyls (PCBs/PCTs) requires the preparation of an inventory of PCB holdings and also requires the making of plans and outlines for the decontamination and disposal of PCBs and PCB-contaminated equipment. Certain provisions of this Directive were transposed into Irish law by the Waste Management (Hazardous Waste) Regulations, 1998. This *Management Plan for Polychlorinated Biphenyls (PCBs)* addresses the principal requirements of the Directive and the Regulations.

This document presents progress on developing a national inventory of PCB holdings and also presents an outline of the strategy to be adopted in managing the disposal of PCBs and PCB-contaminated equipment. Table 1 summarises the required and recommended actions to be taken by holders of PCBs. This Management Plan explains how these actions should be carried out.

Section 1 presents an introduction to PCBs and their definition.

Section 2 outlines the legislation that underpins the preparation of this Management Plan.

Section 3 explains the legal obligation on holders of PCBs, used PCBs and equipment which contains in excess of 5 litres of PCBs to report those holdings to the EPA on an annual basis. This obligation began in 1998. Up until mid-2001, only 2 notifications were received.

Section 4 presents the results of the survey of PCB holdings carried out in 2001. Over 1,000 survey questionnaires were distributed to industries and facilities identified as potential PCB users, including IPC-licensed facilities, high voltage electrical users, local authorities, hospitals and schools. Over 350 responses were received of which approximately 200 involved PCB holdings. Those notified holdings which meet the requirements set out in section 3 will be presented on a national register of PCB holdings. In volume terms, large holdings represent a significant proportion of all PCBs in use. Smaller holdings will be recorded separately and the information will be used to establish the full extent of PCB use.

Section 5 provides outline information on how to identify whether items of electrical equipment contain PCBs. In case of doubt, or in the absence of contrary information (such as analytical testing results or a 'PCB-free' label), items of equipment manufactured prior to:

- 1986 for transformers and large capacitors; and
- 1989 for small capacitors and lighting ballasts

should be assumed to contain PCBs.

Section 6 outlines the legislative requirements in terms of labelling PCB containers, PCB-contaminated equipment, the premises where such equipment is located and decontaminated equipment. Section 6 also states the required standards to be achieved in decontaminating equipment and outlines some requirements in terms of fire prevention.

Section 7 outlines the legislative requirements in terms of PCB transport and disposal contractors. All holders of PCBs who contract such services should be satisfied that a contractor has complied fully with all relevant waste legislation and that waste PCBs are disposed of in a manner that will not cause environmental pollution. Section 7 also outlines the provisions that exist or should be made to ensure that all waste PCBs are collected and disposed of in an appropriate manner and that landfill is avoided.

Section 8 outlines the incentives, both positive and negative, that will be or are available to be used in encouraging the early removal and disposal of PCBs and PCB-contaminated equipment. The first incentive to be applied is an annual notification fee which will be

introduced after 1 September 2002. Notifications received prior to the introduction of the fee will not be subject to the notification fee.

Section 9 outlines the requirements to make buildings managers, electrical contractors, demolition contractors, waste contractors and other groups aware of the obligations and opportunities that exist in terms of managing PCBs.

**Table 1 Summary of actions to be taken in accordance with the Waste Management (Hazardous Waste) Regulations 1998**

Action	Category of PCB holding			
	PCBs, used PCBs, waste PCBs	Equipment containing >5 dm <sup>3</sup> PCB with a ...		Equipment containing <5 dm <sup>3</sup> PCB
		concentration >0.05%	Concentration 0.005-0.05%	
Report to EPA by 1 September each year (see section 3)	✓	✓	✓	✗
Label equipment and premises (see section 6)	✓	✓	✓	✗
Dispose of PCBs and PCB-contaminated equipment: (see section 2)				
(a) as soon as possible	✓	✗	✗	✗
(b) by 2010		✓		
(c) at end of useful life			✓	✓

✓ = obligatory action

✗ = recommended action

Note: 1 dm<sup>3</sup> = 1 litre

## 1. Introduction to PCBs

PCB is the common name attributed to polychlorinated biphenyls, a group of aromatic chlorinated compounds. There are 209 possible PCB compounds, with one to ten chlorine atoms per molecule. Individual PCBs range from colourless oily liquids to viscous dark oils and yellow and black resins, depending on the chlorine content. Polychlorinated terphenyls (PCTs) are a similar group of compounds. For the purpose of this Management Plan, PCTs may be considered as a subset of PCBs.

PCBs are defined<sup>1</sup> as:

- polychlorinated biphenyls
- polychlorinated terphenyls
- monomethyl-tetrachloro-diphenyl methane
- monomethyl-dichloro-diphenyl methane
- monomethyl-dibromo-diphenyl methane, or
- any mixture of substances containing any one or more of the aforementioned substances in an aggregate amount which by weight exceeds 0.005% (or 50ppm) by weight of the mixture.

PCBs were first synthesised in 1864<sup>2</sup> but are known to have been commercially produced and sold as pure oil or in equivalent form from around 1929. It is estimated that approximately one million tonnes of PCBs have been produced world wide.

PCBs are extremely stable compounds with excellent electrical and heat transfer properties. These characteristics have led to their widespread use in a variety of industrial, commercial and domestic applications. PCB applications are commonly categorised as *open* (or dispersive) or *closed* (or non-dispersive) applications, as follows:

Open applications: use as heat exchange fluids, hydraulic oils, lubricating oils and as additives in paints, plastics, solvents, adhesives and cements.

Closed applications: use as insulating fluid in electrical transformers, capacitors, power factor correction units, lighting ballasts, vacuum pumps and submersible pumps.

Soils or other materials (that are intentionally or inadvertently contaminated with PCBs - for example, as a result of a spillage) that contain PCBs at a concentration greater than 0.005% by weight will be classified as PCBs in accordance with the definition given above.

Concern over the toxicity and persistence of PCBs led to restrictions on the marketing and use of PCBs, particularly for open applications, in Europe and America in the early 1970s. However, the use of PCBs in closed systems was permitted up until the late 1970s in the USA and the 1980s in Europe. A review of available PCB inventories across Europe, America and Australasia reveals that approximately 70% of all PCBs manufactured have been used in closed applications.

---

<sup>1</sup> Waste Management (Hazardous Waste) Regulations 1998, S.I. No. 163 of 1998.

<sup>2</sup> Neumeier, G., 2001, The Technical Life Cycle of PCBs, A Case Study for Germany.

Appendix A provides additional information on PCB sources and use, including a PCB use tree, a summary of common industrial uses, and information on likely disposal routes for PCBs or potential causes of environmental pollution.

## 2. Legislation and legal requirements

PCBs are covered principally by an EU Directive and two sets of national Regulations.

*Council Directive 96/59/EC on PCBs and PCTs*

The PCB Directive sets out broadly the requirements for the quantification of PCB holdings and the requirement to plan for the decontamination and disposal of all PCB holdings. The text of the Directive is available at <http://www.europa.eu.int/eur-lex/en/index.html>.

*Waste Management (Hazardous Waste) Regulations, 1998, S.I. No. 163 of 1998*

These Regulations implement provisions of the PCB Directive and set out the requirements in terms of disposing of PCBs and registering holdings of PCBs. The provisions are summarised in Table 2. The relevant text of the Regulations is reproduced in full in Appendix B.

**Table 2 Summary of certain provisions of the Waste Management (Hazardous Waste) Regulations 1998 in relation to polychlorinated biphenyls (PCBs)**

Category of PCB holding	Action required	
PCBs		To be disposed of as soon as possible (Article 14(1)(b))
Used or waste PCBs	Subject to inventory and notification to the Agency of holdings (Article 15(1))	To be disposed of as soon as possible (Article 14(1)(a))
Equipment containing >5dm <sup>3</sup> PCB	Subject to labelling requirements (Article 14(1)(c))	Equipment containing a concentration >0.05% by weight of PCBs shall be decontaminated or disposed of by end 2010 (Article 14(3)(a)). Equipment containing a concentration between 0.005% and 0.05% by weight of PCBs may be decontaminated <i>or alternatively</i> disposed of at the end of its useful life (Article 14(3)(b)).
Equipment containing <5dm <sup>3</sup> PCB	Removal and separate collection of equipment upon taking it out of use, recycling or disposal (Article 14(1)(e)).	

Note: Decontamination and disposal are defined in Article 13(1) of the Regulations.

*European Communities (Dangerous Substances and Preparations)(Marketing and Use) Regulations, 2000, S.I. No. 107 of 2000*

These regulations implement Council Directives 85/467/EEC and 89/677/EEC in relation to polychlorinated biphenyls (except mono and dichlorinated biphenyls); polychlorinated terphenyls; and preparations, including waste oils, with a PCB or PCT weight content higher than 0.005%. These substances may not be used, except in designated applications which were in service prior to 30 June 1986. Equipment and plant containing PCBs or PCTs are required to display instructions concerning disposal and maintenance and use of equipment and plant containing them.

### **3. Notification of PCB holdings**

#### **3.1. Notifying the EPA**

Article 15 of the Waste Management (Hazardous Waste) Regulations, 1998, requires holders of PCBs, used PCBs or contaminated equipment containing more than 5 dm<sup>3</sup> of PCBs to give notice to the EPA of such holdings. Up until 2001, two notifications were received. In 2001, the EPA commissioned a study to compile information on PCB holdings. A questionnaire was issued to 1,000 organisations of which 400 replied and 200 were identified as holding PCBs of various categories and uses.

Holders of PCBs, used PCBs or contaminated equipment containing more than 5 litres of PCBs are required to give notice in writing to the EPA in relation to such PCBs, used PCBs or equipment. The following information must be provided:

- (a) the name and address of the holder;
- (b) the location and quantity of the PCBs or used PCBs;
- (c) the location and description of equipment;
- (d) the quantity of PCBs contained in such equipment;
- (e) the measures taken or proposed to be taken (including a timescale) for the decontamination or disposal, as the case may be, of the PCBs, used PCBs and equipment; and
- (f) the date of giving such notice.

A notification need not specify the information in items (d) and (e) as regards any equipment in respect of which it is reasonable to assume that the fluid content of the equipment contains between 0.05% and 0.005% by weight of PCBs.

This information must be notified to the EPA and an annual update provided by 1 September each year.

The EPA has commissioned the preparation of a database to store all information received. The information listed above will be made available on the website of the EPA in relation to all holdings of PCBs, used PCBs and contaminated equipment containing more than 5 litres of PCBs that are notified to the EPA.

The EPA is required to monitor the accuracy of information contained in notifications. In order to satisfy this requirement, the EPA will audit, or commission the auditing of, a number of notified holdings each year.

#### **3.2. Notification fee and cost recovery**

In order to support the EPA's functions in relation to processing notifications and monitoring the information received, a notification fee will be introduced after 1 September 2002. Notifications received prior to 1 September 2002 will not be liable for the notification fee.

The notification fee will be set by the EPA so as to fully off-set the cost of maintaining the PCB database and carrying out audits. The notification fee may vary year on year. A sliding scale may be introduced with higher notification fees applying to larger holdings of PCBs. The notification fee to be applied and any subsequent variations will be published on the website of the EPA.

### **3.3. Notification form**

A standard notification form is provided at the end of this document. The standard notification form should be used where possible. The form may be downloaded electronically from the EPA website or photocopied from this document. It should preferably be completed electronically, printed out and signed. The notification form and the notification fee (if applicable) should be sent to the following address:

**PCB Inventory**  
Environmental Protection Agency  
PO Box 3000  
Johnstown Castle Estate  
County Wexford

## 4. Quantities arising and likely sources

### 4.1. Inventory of PCB holdings

During 2001, the EPA commissioned a survey of PCB holdings in Ireland. The results of the survey are presented in this section. Holdings of PCBs have been classified according to the scale of the holding and the obligation to notify that holding.

“Large holdings” represents those individual holdings which are subject to notification in accordance with the Regulations. PCBs could be in use in large holdings at any facility using equipment which draws or holds a significant electrical current or any facility which receives power via high voltage lines. Typical examples include:

- electrical utilities;
- industrial and manufacturing premises;
- railway utilities;
- underground mining operations;
- military installations;
- electronics manufacturing plants;
- water and wastewater treatment plants;
- research laboratories; and
- large buildings such as those used as educational, health or commercial premises.

To date, 21 confirmed or suspected large holdings have been notified, comprising a total volume of 67,050 litres of PCB oils. This total does not include potentially large holdings at electrical and railway utilities, both of which would commonly be reported as having large holdings<sup>3</sup>.

Many sites surveyed in 2001 contained large electrical units manufactured prior to 1986 which have not been tested for PCBs. In accordance with Article 13(2) of the Regulations, in the absence of contrary information (such as analytical data or a confirmed age for the equipment), such units have been assumed to contain PCBs and have been included in the inventory as large holdings.

“Small holdings” represents those individual pieces of equipment with PCB volumes of less than 5 litres. These holdings are not subject to notification but information is sought on small holdings so as to attempt to quantify the total quantity of PCBs in use, and not just the large holdings. A total of 169 small holdings have been notified, comprising a total volume of 3,206 litres of PCB oils.

Table 3 summarises the large holdings and small holdings that were identified during the 2001 survey.

---

<sup>3</sup> The ESB owns and operates over 140,000 transformers. The ESB has confirmed that all large transformers have been tested and have been declared PCB-free. Approximately 4% of the smaller pole-mounted transformers have been tested. PCBs were detected in 0.16% of the smaller units tested, each of which may contain over 40 litres of oil. From this information, it is calculated that over 8,960 litres of PCBs may be contained in 224 of the smaller transformers. This figure has been included in Table 4.

**Table 3 Summary of inventoried large and small holdings**

Individual holdings >5 litres PCBs					Individual holdings <5 litres PCBs		Total volume of PCBs (litres)
Contaminated transformers		Contaminated capacitors		PCBs or used PCBs	Identified lighting ballasts		
No. of units	Volume (litres)	No. of units	Volume (litres)	Volume (litres)	No. of units	Volume (litres)	
64	65,590	127	1,075	385	99,656	3,206	70,256

**4.2. Estimate of non-inventoried holdings**

Many items of household or commercial electrical equipment manufactured prior to 1989 have the potential to contain small amounts of PCBs in the capacitors<sup>4</sup>. Common items that may contain oil-filled capacitors include:

- refrigerators;
- microwave ovens;
- cookers;
- washing machines and dryers;
- dishwashers;
- milking equipment;
- shearing equipment;
- air conditioners;
- dehumidifiers;
- radios;
- photocopying machines;
- oil burners;
- submersible pumps; and
- fluorescent light ballasts or starters.

Each capacitor may contain 20-30 ml of PCBs and some equipment items may contain more than one capacitor. The oil used in capacitors was typically undiluted PCBs and would exceed the 0.05% and 0.005% concentration thresholds. Therefore, almost any industrial, commercial or residential property with electrical equipment manufactured prior to 1989 (see section 5.1) has the potential to be considered a small PCB holding.

The identification of sources of PCBs in New Zealand shows that the most significant sources of small holdings are:

- fluorescent lighting ballasts in commercial and public buildings (hospitals, schools, etc.);
- capacitors contained in dairy and shearing equipment; and
- street lights.

A small holding may, on closer inspection, contain more than 5 litres of PCBs located in various small items of equipment. For example, a small to medium sized older building, with a floor space of 800m<sup>2</sup> and an average light spacing of one fluorescent fixture per 5m<sup>2</sup>, could conceivably contain over 5 litres of PCBs in the lighting ballasts and starter capacitors alone.

Table 4 contains a preliminary estimate of the extent of non-inventoried large and small holdings in Ireland. The calculations are likely to be highly conservative and are presented with a significant degree of uncertainty. They do however provide an illustration of the scale of

---

<sup>4</sup> A USEPA survey estimated that 25% of all household white goods have PCB-containing capacitors (Management of Polychlorinated Biphenyls in the United States, USEPA, 1997).

use and distribution of PCBs. Some of the calculations are based on observations made during site visits carried out on behalf of the EPA during 2001 to a small number of hospitals, schools and farms. Table 4 does not include an estimate of PCB-containing capacitors that may be contained in household white goods, nor does it include an estimate of all large holdings that have yet to be notified.

**Table 4 Summary of estimated non-inventoried holdings**

<b>Facility type</b>	<b>Total number of premises older than 1989</b>	<b>Estimated volume of PCBs (litres)</b>
Schools and colleges	3,067	4,649
Hospitals	51	17,078
Commercial premises	89,285	178,570
Street lighting <sup>5</sup>	114,877	3,446
Farms	128,610	51,084
ESB <sup>3</sup>	224	8,960
<b>Total</b>	<b>336,114</b>	<b>263,787</b>

---

<sup>5</sup> Value for Money Study No. 10 - Public Lighting, Department of the Environment, Dublin, 1995.

## 5. Identification of PCBs and contaminated equipment

*“Any equipment of a type which is likely to contain PCBs shall ... be considered as containing PCBs unless it is reasonable to assume the contrary.”*

Article 13(2), Waste Management (Hazardous Waste) Regulations, 1998

### 5.1. Identification of equipment

Historical production of PCBs is known to have been undertaken by manufacturing facilities in the USA, UK, France, Italy, USSR, Germany, Spain, Czechoslovakia, Austria, China and Japan. PCBs were commercially manufactured for over 60 years by dozens of manufacturers using over 100 different trade names. The large variety of equipment and oil names and a general inadequacy of equipment labelling complicates the identification of PCB-containing equipment.

The following information is provided to assist with the identification of PCB oils and associated equipment:

- Appendix C - a list of common trade names for the various mixtures of PCB oils. Where possible, the country of origin and/or manufacturer has also been identified;
- Appendix D - a list of transformer manufacturers reported to have used PCB oils in their equipment; and
- Appendix E - a list of capacitor manufacturers reported to have used PCBs in their equipment.

The lists in the Appendices should not be assumed to be exhaustive or all-inclusive. If there is any doubt about whether an item of equipment contains PCBs, assume that it does. Additional information under any one of the above categories, or additional information that might assist in the identification of PCBs and contaminated equipment, should be forwarded to the EPA at the address given on the title page of this document.

The following should be used as a guide in the identification of PCB-containing equipment. Analytical testing is always recommended prior to disposal of equipment suspected of containing PCBs.

**Transformers:** Review the manufacturer's name plate and compare against Appendix C and Appendix D. If a match is found it may be assumed that it contains 600,000-700,000 ppm PCBs<sup>6</sup>. Where such data is not available, an estimate of the unit's age should be made. Units manufactured in the USA after 1977 should contain a 'PCB-free' label. In the EU, the sale of certain items of PCB-containing equipment was banned from 1986. On the other hand, some transformer manufacturers in the USSR were still using PCBs up until 1993. Therefore, in the absence of contrary information, any transformer which was manufactured in 1986 or earlier (or if from the USSR or former USSR countries, 1993 or earlier) should be considered to potentially contain PCB oils until such time as analytical testing or other evidence may prove otherwise.

The volume of oil will vary greatly from unit to unit and may range from 0.2 to 4,000 litres. Where the volume is not specified on the equipment, an initial estimate may be made by measuring the outer dimensions of the transformer. Wet cell transformers typically contain 50-80% fluid by volume.

---

<sup>6</sup> Polychlorinated Biphenyls, USEPA Region III Waste and Chemicals Management Division, 2001.

**Capacitors:** Review the manufacturer's name plate and compare against Appendix C and Appendix E. PCBs are known to have been used in capacitors up until 1989 and in the absence of contrary information, any capacitor manufactured during or prior to 1989 should be assumed to contain PCBs.

Typically a capacitor containing PCBs will be a completely sealed unit with two electric contacts. Over 70% of all capacitors are used as power capacitors and will contain 10 to 20 litres of oil. Small capacitors, such as those associated with household appliances, generally contain 0.05 to 1.8 litres of oil.

**Power factor correction (PFC) units:** Review the manufacturer's name plate and compare against Appendix C and Appendix E. Power factor correction units are typically comprised of several smaller capacitors and therefore the PCB-free date is the same as capacitors, i.e. post-1989.

Power factor correction units are generally of uniform size (approximately 60x30x15 cm) and contain approximately 1.8 litres of oil.

**Lighting ballasts:** Lighting ballasts rarely display sufficient technical details to determine their PCB-status. Ballasts manufactured in the USA after 1979 will have 'PCB-free' labels attached. No such equivalent requirement in the EU is known to exist. As a general rule, all lighting ballasts manufactured before 1989 that do not contain a 'PCB-free' label should be considered to contain PCBs.

Each lighting ballast typically contains 0.01 to 0.03 litres of PCB fluid and there is generally one ballast for every two fluorescent lighting tubes.

All holders of electrical equipment should systematically determine whether their equipment contains or potentially contains PCBs. Any PCB-containing equipment or suspect PCB-containing equipment should be notified to the EPA in accordance with section 3 of this document.

The EPA will continue to update the available information on the identification of PCB holdings as it becomes available. Any such information should be submitted to the EPA.

## 5.2. Testing and analysis

Oil filled electrical transformers and capacitors older than 1986 and 1989 (inclusive) respectively should be assumed to contain PCBs unless analytical testing or appropriate labelling indicates that the units are PCB-free (i.e. contain less than 0.005% by weight PCBs).

It is often not possible to access the oil in a sealed electrical unit. In such cases, it is not reasonable to test the unit before it is taken out of service for disposal. Such units should be assumed to contain PCBs as described above (section 5.1).

For sampling, ASTM Standard D-923 (Sampling) is the recommended reference method for obtaining liquid samples for analysis.

For analysis, Commission Decision 2001/68/EC established two reference methods of measurement for PCBs pursuant to Article 10(a) of the PCB Directive. European standards EN 12766-1 and prEN 12766-2 and subsequently upgraded versions shall be applied as the reference method for the determination of PCBs in petroleum products and used oils. European standard IEC 61619 and subsequently upgraded versions shall be applied as the reference method for the determination of PCBs in insulating liquids.

Analysis for total organic chlorine or chloride is not an acceptable test method for quantifying PCB concentration.

Two companies have been identified by the EPA as providing PCB analysis services. Further information on testing laboratories should be submitted to the EPA at the address given in the title page of this document.

There are a number of commercial PCB test kits available which can be used by 'non-chemists' as an initial screen for PCBs. Common trade names include Clor-N-Oil and Clor-D-Tech. Additional details (including USEPA assessments) of these and other tests are provided in the following websites: [www.tredi.co.nz/html/identify.htm](http://www.tredi.co.nz/html/identify.htm) and [www.epareachit.org/DetailCharacterization/Overview.asp](http://www.epareachit.org/DetailCharacterization/Overview.asp). The kits may be used as screening tools in the field but cannot be relied upon to provide accurate results. Hence any indication of potential PCB content as a result of the use of a test kit should be verified by formal laboratory tests.

All appropriate health and safety measures must be taken when accessing electrical equipment for sampling. Advice should be sought from an appropriately qualified person or from the Health and Safety Authority.

Original laboratory reports may be requested during an audit of PCB holdings and should be retained.

## **6. Labelling, in-use management and decontamination of PCBs**

While all holders of PCBs should strive to dispose of those PCBs as soon as possible, it is permissible to retain PCBs in operation according to the decontamination or disposal timetable summarised in Table 2. This continuation in use applies solely to such PCBs that are contained in items of equipment that are currently in use. The following requirements in terms of managing PCB holdings are set out in the Regulations and should be followed.

### **6.1. Labelling of PCB-contaminated equipment**

Article 14 of the Waste Management (Hazardous Waste) Regulations, 1998, requires that PCB identification labels be affixed:

- (a) to equipment containing more than 5 litres of PCBs; and
- (b) to the doors of premises where such equipment is located.

The labels must be indelible, easily visible and legible. The labels must state that the equipment is contaminated with PCBs or that the premises contains contaminated equipment, as appropriate.

Where it is reasonable to assume that a particular item of equipment contains PCBs at a concentration between 0.05% and 0.005% (and where the equipment contains >5 litres of PCBs), then that item of equipment may be labelled as "PCBs contaminated < 0.05%".

### **6.2. In-use management of PCB-contaminated equipment**

PCBs and PCB-contaminated equipment must be kept separate from flammable materials and holders should take all necessary precautions to avoid any risk of fire which might involve PCBs.

It is recommended that holders of PCBs copy their PCB notification to the local authority and fire officer in their areas as, in the event of fire, the presence of PCBs may present a significant health and environmental pollution risk.

### **6.3. Decontamination of PCB-contaminated equipment**

Article 14(2) of the Waste Management (Hazardous Waste) Regulations, 1998, specifies that transformers containing more than 0.05% by weight of PCBs shall be decontaminated so as to reduce the level of PCBs, if possible, to less than 0.005% by weight. The replacement fluid must entail markedly lesser risks and must not compromise the subsequent disposal of the PCBs.

Decontamination should only be carried out by experienced practitioners. Eurotech Environmental (UK) (see Appendix F) is the only decontamination practitioner known to be operating in Ireland at present. Any other providers of the service should notify the EPA to be included in an updated list of practitioners.

The choice and economic feasibility of decontamination versus transformer disposal should be carefully considered, given that equipment which may need decontamination will now be 15 years or older. Decontamination will result in the generation of a significant volume of PCB-contaminated flushing solvent, which will be dealt with as a hazardous waste. If decontamination to 0.005% cannot be achieved, then a notifiable PCB holding still remains with all its attendant liabilities.

Decontamination is not a recommended option. Rather, it is recommended that, where feasible, transformers are removed and disposed of.

**6.4. Labelling of decontaminated equipment**

Article 14(2) of the Regulations states that a transformer's label be replaced after decontamination by a label in the form set out in Appendix B.

**6.5. Code of Practice for in-use management of PCBs**

The EPA will consider the preparation of a Code of Practice for the continued in-use management of PCB contaminated equipment. The EPA will consult with relevant stakeholders in respect of the proposed content of such a Code of Practice and whether compliance with the Code of Practice should be made a statutory obligation.

## 7. Collection and storage of PCBs and PCB-contaminated equipment

### 7.1. General provisions

The collection of PCBs has to date been carried out by commercial waste contractors who undertake to collect PCBs and PCB-contaminated equipment and arrange for its disposal. All PCB wastes are currently exported as there are no licensed facilities in Ireland for their disposal, except for storage prior to export.

Nine contractors were identified (in 2001) who handle PCB wastes. Contact details are given in Appendix F. According to information provided to the EPA, typical costs will range from €1,270 to €6,350 per tonne of PCB oil and contaminated equipment, including collection and transport costs.

Holders of PCB wastes should assure themselves of any waste contractor's bona fides prior to employing his or her services. The following describes the framework under which waste contractors are regulated and for which evidence of compliance should be sought:

#### *Collection of waste PCBs*

All collectors and transporters of waste should have made an application for or received a waste collection permit issued under the Waste Management (Collection Permit) Regulations, 2001, S.I. No. 402 of 2001. Ensure that the collection permit covers the collection of waste from your area (for the purpose of the Collection Permit Regulations, there are ten administrative areas in the country).

#### *Storage of waste PCBs*

Any storage facility for PCB wastes must have an EPA licence issued under the Waste Management (Licensing) Regulations 1997 or 2000<sup>7</sup>. Ensure that the licence does not specifically prohibit the storage of hazardous waste or PCB wastes. A list of all EPA licensed facilities may be found on the EPA website under Waste Management Licensing. Individual licences may be downloaded.

#### *Disposal of PCBs*

There are currently no PCB disposal facilities in Ireland. All PCB wastes must be exported for disposal abroad.

The National Hazardous Waste Management Plan recommends that a thermal treatment facility be established for the treatment of hazardous waste. In the event that a facility is established, it may be suitable for disposing of some or all of the PCB wastes likely to arise in Ireland in the coming years.

#### *Export (and Import) of PCB wastes*

Exports of hazardous waste are governed by Council Regulation 259/93/EC on the transfrontier shipment of waste and by the Waste Management (Transfrontier Shipment of Waste) Regulations, 1997, S.I. No. 149 of 1998. The contractors listed in Appendix F will typically handle the administrative procedures associated with this legislation.

---

<sup>7</sup> Waste Management (Licensing) Regulations, 2000, S.I. No. 185 of 2000, which replaced the Waste Management (Licensing) Regulations, 1997, S.I. No. 133 of 1997.

## 7.2. Large holdings

Large holdings of PCBs are to be disposed of:

- as soon as possible in the case of PCBs or used PCBs; or
- by 2010 in the case of equipment contaminated by or containing more than 5 litres of PCBs.

Large holdings are most likely to be in the possession of large organisations who should have little difficulty in arranging for a waste contractor to collect and dispose of PCBs. From an economic point of view, holders of PCBs should endeavour to take the opportunity, where possible, to investigate and dispose of all PCBs in one sweep. As the size of a job increases, the unit charge is likely to be less.

The 2010 deadline is considered adequate for PCB holders to investigate their requirements in terms of equipment replacement and PCB disposal. However, earlier disposal will ensure that a holder is removed from the register of PCB holdings and that ongoing annual registration fees are not incurred.

## 7.3. Small holdings

Small holdings are not always so attractive commercially for waste contractors to collect and consequently larger charges are likely to apply. In addition, small holders may be unable or unwilling to pay the costs associated with hazardous waste disposal. Special arrangements for the collection and disposal of small holdings may be required.

As mentioned above, the small holdings are most likely to be capacitors contained in everyday electrical equipment. Each capacitor may contain 20-30 ml of PCBs and some items of equipment may contain more than one capacitor. Some of the most significant sources are relatively easily identified and are likely to include fluorescent lighting ballasts, including street lights, and capacitors contained in farm dairy and shearing equipment. Such items are often likely to come to light only upon replacement or during building refurbishment. Electricians, electrical and demolition engineers and waste contractors should be provided with the necessary information to:

- enable them to identify known or suspected PCB-containing equipment; and
- allow them to safely remove and deliver that equipment to appropriate collection locations.

Information will be provided to electrical and demolition contractors, as well as to buildings managers and other target groups, under the information and awareness campaign described in section 9.

Collection locations should be provided by each local authority at appropriately manned civic amenity or recycling centres or, by contractual arrangement, at licensed private sector facilities.

Depending on the scale of small holdings that do arise, the putting in place of a national contract may be beneficial for the collection of small holdings on a periodic basis from local authority collection facilities and for the aggregation and export of such loads.

There is currently no prescribed timetable for the disposal of small PCB holdings. This means that PCBs may continue to arise as waste for the next two decades or more. However, the following factors, combined with effective information and financial incentives, may contribute towards accelerating the removal and disposal of PCBs and ensuring that PCBs do not cause environmental pollution.

Small holdings are now at least 13 years old and many (if not most) will be coming to the end of their useful lives by 2010. In addition, existing regulation requires that:

- all PCB waste is to be kept separate from all other waste types; and
- no PCB waste may be disposed of at landfill sites in Ireland.

If existing legislation is effectively enforced, particularly in terms of electrical and demolition contractors and at landfill sites, then the risk of environmental pollution resulting from PCB removal and disposal will be minimised.

Progress in disposing of small holdings will be monitored and the recommendations made here may be amended where considered necessary. In particular, more stringent regulatory requirements may be necessary so as to ensure that all PCBs are disposed of in an acceptable manner. A deadline for the removal and disposal of small holdings may be appropriate and needs to be considered in the light of experience and improved data on small holdings.

Responsibility for the implementation of elements of this Plan needs to be clarified by the Department of the Environment and Local Government.

## 8. Incentives

The co-operation of industry and commercial representative organisations is essential in ensuring that PCBs are removed and disposed of in accordance with legislative requirements. The EPA would prefer to see accelerated removal and disposal of PCBs, not only of large holdings but also of low volume and dispersed small holdings, particularly where these may be located in areas such as food production, healthcare and educational facilities. The following incentives would assist in the removal and disposal of PCBs.

1. A PCB registration fee will be introduced after 1 September 2002. The fee will be levied on all holders of PCBs. The fee will not be payable once all PCBs are certified as having been removed. The fee will accelerate the removal and disposal of PCBs. (See section 3.2).
2. To counteract against 'free-riders' who may seek to avoid the registration fee by simply not registering, active enforcement of the legislation will be required. The active involvement of local authorities will be important in ensuring accurate information on PCB holdings within their functional areas.
3. The provision of financial assistance for the early removal and disposal of PCBs may be necessary.
4. Facilitation of the collaborative disposal of PCBs from several holdings could reduce the unit cost of PCB removal and disposal. For small holdings, local information surveys are likely to be required to establish the quantity of PCB holdings in any one area. Collaboration may also be facilitated by service providers creating awareness of PCB obligations and treatment and management options.

## 9. Information and awareness

During the survey of PCB holdings carried out in 2001, it was evident that most organisations were unaware of their obligation to report holdings of PCBs. There was also a general unawareness of the fact that PCBs were contained in certain items of equipment. In order to increase the level of awareness of PCBs and to improve the rate of notifications, an information campaign will be necessary. Development of the information campaign should involve consultation with stakeholders, including Government departments, EPA, ENFO, local authorities and commercial representative bodies, with regard to the content of such information and awareness campaigns and the respective roles of those stakeholders in disseminating information. Different sectors such as industry, farmers, electrical contractors, waste recyclers and householders will have different information requirements and this needs to be taken into account when designing information campaigns.

Resources to fund information campaigns will be required and may be available from the following sources:

- PCB notification fee; and
- Environment Fund.

Information developed can be published on the EPA's website and should also be disseminated to relevant target groups.

**Appendix A: Background information on PCBs uses and possible environmental pollution pathways**

**PCB USE TREE (prepared by the Lake Superior Work Group)**

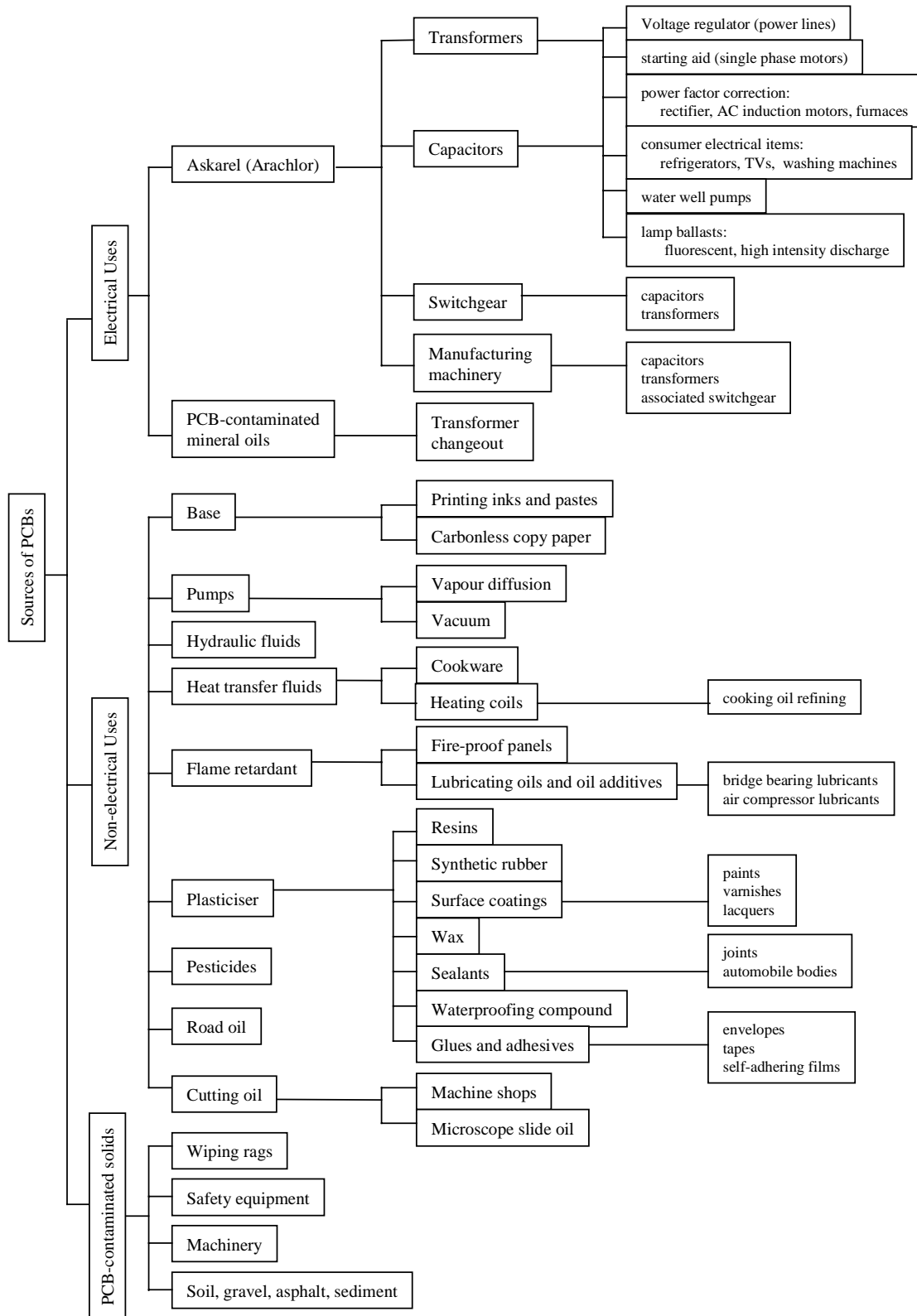


TABLE A1

## POTENTIAL PCB INDUSTRIAL SOURCES

SOURCE	COMMON PCB CONTAINING EQUIPMENT
<b>Electric Utilities</b> and distribution networks.	Transformers, large and small capacitors, switches, voltage regulators, liquid filled cables, circuit breakers, lighting ballasts
<b>Industrial Facilities</b> including aluminium, copper, iron and steel smelting, cement manufacturing, chemical manufacturing, plastics, synthetics and petroleum refining.	Transformers, large and small capacitors, power factor correction units, heat transfer fluids, hydraulic fluids, voltage regulators, liquid filled cables, circuit breakers, lighting ballasts
<b>Local Authorities</b> including water treatment and distribution networks, wastewater treatment plants and street lighting	Vacuum pumps, submersible pumps, small capacitors, power factor correction units
<b>Animal Farming</b> including dairies/milking sheds, shearing sheds and piggeries.	Large and small capacitors, power factor correction units, submersible pumps
<b>Railroad Systems</b>	Transformers, large capacitors, voltage regulators, circuit breakers
<b>Underground Mining</b>	Transformers, large capacitors, power factor correction units, hydraulic fluids, voltage regulators, circuit breakers,
<b>Military Installations</b>	Transformers, large and small capacitors, voltage regulators, circuit breakers, lighting ballasts, hydraulic fluids
<b>Large Buildings</b> including residential, commercial, educational and health premises.	Small capacitors, circuit breakers, lighting ballasts
<b>Research Laboratories</b>	Vacuum pumps, lighting ballasts, small capacitors, circuit breakers
<b>Electronics Manufacturing</b>	Vacuum pumps, lighting ballasts, small capacitors, circuit breakers

Source: *Guidelines for the Identification of PCBs and Materials Containing PCBs*, UNEP, 1999. Augmented by URS Survey data

**TABLE A2**  
**POTENTIAL PCB WASTE SOURCES**

ACTIVITY/SOURCES	TYPICAL LOCATIONS
Auto-Shredder Residues, fluff <sup>8</sup>	Landfills (Municipal and Industrial)
Inadvertent Production by Chemical Plants	Industrial waste disposal sites Industrial waste water streams
Navigational Dredging	Dredged water bodies and their sediments
Transfer Spillage <sup>9</sup>	Soil or water near landfills and industrial sites and along the roads between locations
Accidents/Fires	Power distribution networks (e.g. Transformers) Industrial sites Materials from burnt buildings
Vacuum Pump Cooling Water or Condensate	Water discharge sites and leakage
Floor and Equipment Clean-Up Wastes	Landfills Industrial dump sites
Repair or Decommissioning of Equipment	Repair shop grounds Waste disposal sites Equipment repair or decommissioning sites Industrial facility grounds
Building Demolition	Landfills Waste disposal sites
Various Recycling Operations Reused Oil Practices	Recycled oil in equipment Industrial plants Pesticide formulation Soft soap formulations Natural gas pipelines (from compressors) Automobile service stations

*Source: Guidelines for the Identification of PCBs and Materials Containing PCBs, UNEP, 1999.*

<sup>8</sup> Waste (upholstery, padding, insulation material, etc.) derived from the shredding of cars and appliances.

<sup>9</sup> PCB leakage that may take place during the transfer of PCB-containing waste from one location to another.

## Appendix B: Text of the Regulations

*Extract from Waste Management (Hazardous Waste) Regulations, 1998, S.I. No. 163 of 1998 (from <http://www.gov.ie/ag/>).*

### PART IV

#### POLYCHLORINATED BIPHENYLS (PCBs)

*Interpretation for Part IV.*

13. (1) In this Part —

"contaminated equipment" means any equipment (including any transformer, power capacitor or receptacle containing residual stocks) which —

(a) contains PCBs, or

(b) having contained PCBs, has not been subject to decontamination;

"decontamination" means any operation which enables equipment, objects, materials or fluids contaminated by PCBs to be recovered or disposed of without causing environmental pollution, including the replacement of PCBs by fluids which do not contain PCBs, and "decontaminated" shall be construed accordingly;

"disposal" means any of the activities specified at item 6, 7 or 13 of the Third Schedule to the Act, incineration on land or, in the case of contaminated equipment or used PCBs which cannot be decontaminated, safe deep underground storage in dry rock formations;

"equipment containing more than 5 dm<sup>3</sup> of PCBs" includes, in the case of power capacitors, such equipment where the separate elements of a combined set contain amounts of PCBs which in aggregate exceeds 5 dm<sup>3</sup>;

"PCBs" means —

- polychlorinated biphenyls
- polychlorinated terphenyls
- monomethyl-tetrachlorodiphenyl methane
- monomethyl-dichloro-diphenyl methane
- monomethyl-dibromo-diphenyl methane, or
- any mixture of substances containing any one or more of the aforementioned substances in an aggregate amount which by weight exceeds 0.005% by weight of the mixture;

"used PCBs" means PCBs which are waste within the meaning of Section 4(1)(a) of the Act.

(2) Any equipment of a type which is likely to contain PCBs shall, for the purposes of these Regulations, be considered as containing PCBs unless it is reasonable to assume the contrary.

*Requirements on holders of PCBs.*

14. (1) A holder of PCBs, used PCBs or contaminated equipment shall, as the case may be -
- (a) ensure that used PCBs are disposed of as soon as possible;
  - (b) subject to sub-article (3), ensure that PCBs and contaminated equipment and the PCBs contained in such equipment are decontaminated or disposed of as soon as possible;
  - (c) subject to sub-article (4), affix to equipment containing more than 5 dm<sup>3</sup> of PCBs and to the doors of premises where such equipment is located an indelible label, so printed as to be easily visible and legible, stating, as the case may be, that the equipment is, or the premises contain equipment that is, contaminated by PCBs;
  - (d) keep such PCBs or equipment separate from flammable materials and otherwise take such precautions as are necessary to avoid any risk of fire; and
  - (e) where reasonably practicable, implement and operate a source separation programme in respect of equipment which contains less than 5 dm<sup>3</sup> of PCBs and is a component of another piece of equipment, that is to say, to remove and arrange for the separate collection of such components with a view to their recovery or, where that is not economically feasible, their disposal, in a facility authorised for that purpose.
- (2) Transformers containing more than 0.05% by weight of PCBs shall be decontaminated in accordance with the following conditions:—
- (a) the objective of decontamination shall be to reduce the level of PCBs to less than 0.05% by weight and, if possible, to 0.005% or less by weight;
  - (b) the replacement fluid not containing PCBs must entail markedly lesser risks;
  - (c) the replacement of the fluid must not compromise the subsequent disposal of the PCBs, and
  - (d) the labelling of the transformer after its decontamination must be replaced by labelling in the form set out in the Second Schedule to these Regulations.
- (3) (a) In the case of contaminated equipment containing more than 5 dm<sup>3</sup> of PCBs, decontamination or disposal in accordance with sub-article (1)(b) shall, subject to paragraph (b), be effected not later than the 31st day of December, 2010.
- (b) As a derogation from the requirements of sub-article (1)(b) in the case of a transformer or other equipment the fluid content of which contains between 0.05% and 0.005% by weight of PCBs, such equipment may be decontaminated in accordance with sub-article (2) or disposed of at the end of its useful life.
- (4) For the purposes of paragraph (c) of sub-article (1), equipment in respect of which it is reasonable to assume that the fluid content of the equipment contains between 0.05% and 0.005% by weight of PCBs may be labelled as "PCBs contaminated 0.05%".

*Provision of information to the Agency.*

- 15.** (1) Subject to sub-article (2), a holder of PCBs, used PCBs or contaminated equipment containing more than 5 dm<sup>3</sup> of PCBs shall, not later than the 1st day of September 1998 and not later than the 1st day of September in each year thereafter, give notice in writing to the Agency in relation to such PCBs, used PCBs or equipment of, as appropriate —
- (a) the name and address of the holder,
  - (b) the location and quantity of the PCBs or used PCBs,
  - (c) the location and description of the equipment,
  - (d) the quantity of PCBs contained in such equipment,
  - (e) the measures taken or proposed to be taken (including a timescale) for the decontamination or disposal, as the case may be, of the said PCBs, used PCBs and equipment, and
  - (f) the date of giving such notice.
- (2) A notice under sub-article (1) need not specify information for the purposes of paragraphs (d) and (e) of that sub-article as regards any equipment in respect of which it is reasonable to assume that the fluid content of the equipment contains between 0.05% and 0.005% by weight of PCBs.
- (3) The Agency shall monitor the accuracy of information notified to it under sub-article (1).

*Prohibition on certain uses of PCBs.*

- 16.** The following are hereby prohibited —
- (a) the importation, production or supply to another person of PCBs or contaminated equipment;
  - (b) with effect from 1 September, 1998, the holding or use of PCBs or contaminated equipment, other than PCBs or equipment which have been notified to the Agency under article 15;
  - (c) the separation of PCBs from other substances for the purpose of reusing the PCBs;
  - (d) the addition of PCBs to transformers or other equipment, and
  - (e) the maintenance of transformers containing PCBs, other than the maintenance of transformers which are in good working order and do not leak and where such maintenance is for the purpose of ensuring that the PCBs contained in the transformers comply with technical standards or specifications regarding dielectric quality.

**SECOND SCHEDULE**

Article 14

**Labelling of Decontaminated Equipment**

Each item of decontaminated equipment must be clearly marked with an indelible and embossed or engraved sign which must include the following information:

**DECONTAMINATED PCB EQUIPMENT**

Fluid containing PCBs was replaced

- ❖ with .....(name of substitute)
- ❖ on .....(date)
- ❖ by ..... (undertaking)

Concentration of PCBs in

- ❖ old fluid .....(% by weight)
- ❖ new fluid .....(% by weight)

**Appendix C: List of PCB trade names**

TRADE NAME	MANUFACTURER/COUNTRY OF ORIGIN
Asbestol	American Corp, USA
Adkarel	
Asbestol	Monsanto, USA
Askarel	UK and USA
Auxol	Monsanto, USA
Aceclor	ACEC, Belgium
Aceclor	France
Arochlor 1221, 1232/1248, 1254, 1260, 1268, 1270, 1342, 2565/4465/5460	Monsanto, USA
Apirolio	Caffaro, Italy
Apiroliia	Caffaro, Italy
Aroclor	UK and USA
Areclor (t)	
Arubren	
ASK	
Bakola 131	Monsanto, USA
Biclor (c)	
Chorextol	
Chlorextol	Allis Chalmers, USA
Chloroextol	Allis Chalmers, USA
C(h)lophen A30	Bayer, Germany
C(h)lophen A50	Bayer, Germany
Clophen A60	
Clophen Apirorio	
Chlorphen	Jard Corp, USA
Chloresil	
Chlorintol	
Chlorinol	USA
Chlorinated Diphenyl	
Clorphen (t)	
Deler	
Delor	Czech Republic
Dialor (c)	
Diaclor	USA
Diachlor	Sangamo Electric
Diachlor	Sangamo Electric

Management Plan for Polychlorinated Biphenyls (PCBs)

TRADE NAME	MANUFACTURER/COUNTRY OF ORIGIN
Diaconal	
Diconal	
Disconon (c )	
Dykanol	USA
Duconal	UK
DK	Italy
DP 3, 4, 5, 6.5	
Educarel	
EEC-18	Power Zone Transformer, USA
Electrophenyl	PCT, France
Elaol	Bayer, Germany
Elemex (t, c)	
Elexem	McGray Edison, USA
Eucarel	
Fenclor 42, 54, 64, 70	Caffaro, Italy
Hexol	Russian Federation
Hivar (c )	
Hydol	USA
Hyvol	Aerovox, Italy
Inclor	
Inclar	Caffaro, Italy
Inerteen 300, 400, 600	Westinghouse, USA
Kan(e)chlor (KC) 200-600	Kanegafugi, Japan
Kanechor	
Kaneclor	
Kaneclor 400	
Kaneclor 500	
Keneclor	
Kennechlor	
Leromoli	
Leromoll	
Magvar	
MCS 1489	
Montar	
Nepolin	USA
Niren	
No-Famol	

Management Plan for Polychlorinated Biphenyls (PCBs)

TRADE NAME	MANUFACTURER/COUNTRY OF ORIGIN
No-Flamol	Wagner Electric, USA
NoFlamol	
Non-Flamable Liquid	ITE Circuit breakers, USA
Phenoclar DP6	Baylor, Germany
Phenoclor DP6	Prodelec, France
Plastivar	UK
Pydraul	USA
Pyroclar	Monsanto, UK
Pyroclor	Monsanto, UK
Pyrochlor	
Pyranol	USA
Pyronal	General Electric, UK
Pysanol	
Physalen	
Phyralene	Prodelec, France
Pyralene 1460	Prodelec, France
Pyralene 1500, 1501	Prodelec, France
Pyralene 3010, 3011	Prodelec, France
Pyralene T1	Prodelec, France
Pyralene T2	Prodelec, France
Pyralene T3	Prodelec, France
Safe-T-America	
Safe-T-Kuhl	Kuhlman Electric, USA
Saft-Kuhl	
Sant(h)osafe	Mitsubishi, Japan
Santosol	
Santvacki	Monsanto, USA
Santovac	
Santovac 1	
Santovac2	
Santowax	
Santothern FR	UK
Santotherm	France
Sant(h)othern FR	Mitsubishi, Japan
Saut(h)otherm	Mitsubishi, Japan
Siclonyl (c )	
Solvol	Monsanto, USA

Management Plan for Polychlorinated Biphenyls (PCBs)

TRADE NAME	MANUFACTURER/COUNTRY OF ORIGIN
Sorol	So(1) vol, USSR
Sovol	So(1) vol, USSR
Therminol	USA
Therminol FR	USA
Terpenylchlore	PCT, France

## Appendix D: List of transformer trade names

### TRANSFORMER MANUFACTURERS HISTORICALLY USING PCBs

MANUFACTURER	COUNTRY OF ORIGIN
Westinghouse General Electric Company Research-Cottrell Niagara Transformer Corp. Standard Transformer Co. Helena Corp. Hevi-Duty Electric Kuhlman Electric Co. Electro Engineering Works R.E. Uptegraff Mfg Co. H.K. Porter Van Tran Electric Co. Esco Manufacturing Co.	<b>USA</b>
British Power Transunal	<b>UK</b>
AEG (Divisions in Germany) Trafo Union (TU)	<b>GERMANY</b>

Source: *Guidelines for the Identification of PCBs and Materials Containing PCBs*, UNEP, 1999.

## Appendix E: List of capacitor trade names

The product or company names in Tables E.1 and E.2 are associated with PCB-containing capacitors. Further published information is available on specific equipment and designations.

The United Nations Environment Programme has published several reports on PCBs identification, management and disposal. Reports available at <http://www.chem.unep.ch/pops/newlayout/repdocs.html>.

A 40 page listing of PCB-containing capacitors was published by ANZECC and is available at <http://www.ea.gov.au/industry/chemicals/swm/pcbs/pcbid.html><sup>10</sup>.

**Table E.1**

Source: *Guidelines for the Identification of PCBs and Materials Containing PCBs*, UNEP, 1999. Available at <http://www.chem.unep.ch/pops/pdf/PCBident/pcbid1.pdf>

- |                                 |                           |
|---------------------------------|---------------------------|
| ➤ ASEA                          | ➤ SPA "Condensator"       |
| ➤ Sieverts                      | ➤ Cornell Dubilier        |
| ➤ Siemens                       | ➤ P.R. Mallory & Co. Inc. |
| ➤ Nokia                         | ➤ Sangamo Electric Co.    |
| ➤ Sprague                       | ➤ Electric Utility Co.    |
| ➤ AEG or Hydrowerk              | ➤ Capacitor Specialists   |
| ➤ ACEC                          | ➤ Jard Corp.              |
| ➤ National Industry             | ➤ York Electronics        |
| ➤ General Electric              | ➤ McGraw-Edison           |
| ➤ Westinghouse                  | ➤ RF Interonics           |
| ➤ Liljeholmen                   | ➤ Axel Electronic Inc.    |
| ➤ Aerovox                       | ➤ Tobe Deutschmann Labs   |
| ➤ Universal Manufacturing Corp. | ➤ Cine-Chrome Lab, Inc.   |

---

<sup>10</sup> *Identification of PCB-Containing Capacitors - An Information Booklet for Electricians and Electrical Contractors*, Australian and New Zealand Environment and Conservation Council (ANZECC) 1997.

**Table E.2**

Source: <http://www.safetyline.wa.gov.au/pagebin/elechazd0003.htm>. On this website, details are available on the make, type, capacitance, dimensions, power and PCB status of a large number of capacitors. Clicking on a manufacturer's name on the website provides data on a particular capacitor.

➤ A.H. HUNT LTD	➤ FRAKO	➤ RIC
➤ ACEC	➤ FUJI KEN	➤ RIC CAPACITORS LTD
➤ AEE	➤ GE	➤ RIFA
➤ AEG	➤ GEC	➤ ROEDERSTEIN
➤ AEI AEROVOX	➤ GLASSMIKE	➤ RS
➤ ALPHA	➤ ICAR	➤ SAMHWA CAPACITOR CO
➤ AME	➤ INCO	➤ SANGAMO
➤ AME BICC	➤ INTERCAP	➤ SCC
➤ AME DUBILIER	➤ IRH	➤ SEI
➤ AME HUNTS	➤ ITAL FARAD	➤ SEIKA ELECTRICS CO LTD
➤ ANDREW ICAR	➤ ITT	➤ SEIRAY
➤ ASEA	➤ JARD	➤ SELENIUM
➤ ASSOCIATED LIGHTING	➤ JOHNSON & PHILLIPS LTD	➤ SH
➤ ATE CO.	➤ KCC	➤ SHIZUKI
➤ ATE	➤ LMT	➤ SIC-SAFCO
➤ AWA	➤ MALLORY	➤ SIEMENS
➤ BAL-CO	➤ MARCON	➤ SIMPLEX
➤ BHC	➤ MAZDALUX	➤ SLIMCAP
➤ BICC	➤ ME	➤ SOLTRA
➤ BICC-NEECO	➤ MEPCO/ELECTRA	➤ SPRAGUE
➤ BOSCH	➤ METALECT	➤ STABILAC PTY LTD
➤ BTH	➤ MF	➤ STATIC
➤ CDG	➤ MF PHILLIPS	➤ STC
➤ CPL	➤ MICRO (ALELKO)	➤ STEDEPOWER
➤ CTS	➤ MKL	➤ SUDD
➤ D	➤ MKP	➤ TCC
➤ DALY	➤ MOTOR START	➤ TEAPOL
➤ DANCO	➤ MOTOROLA	➤ THE CAPACITRON CO
➤ DAWCO	➤ MP	➤ THE TELEGRAPHIC CONDENSOR CO
➤ DAWSON	➤ MPW	➤ THORN
➤ DICC	➤ MSP	➤ TMC
➤ DUBILIER	➤ NATRONIC	➤ TOC
➤ DUCATI	➤ NICHICON	➤ UCC
➤ DUCON	➤ NICHICON CAPACITOR CO	➤ USHA
➤ DUCONOL	➤ NIPPON	➤ WATSON
➤ ELNA	➤ NOVEA	➤ WEGO
➤ ENDURANCE	➤ NTK	➤ WEGO CONDENSOR CO
➤ ERICSSON/RIFA	➤ OMD	➤ WESTERN ELECTRIC
➤ ERO	➤ PHILLIPS	➤ YESHA
➤ ESHA	➤ PLESSEY	➤ YESHA ELECTRICALS
➤ FAC	➤ PLESSEY CAPACITORS	➤ YUNCHANG
➤ FERGUSON	➤ PLESSEY UK	
➤ FIRBOURG	➤ PYE	
➤ FLUORSEAL	➤ RDE	

## Appendix F: List of contractors

An extensive list of waste contractors is contained on the following websites: [www.citall.com](http://www.citall.com) and [www.irelandrecycling.ie](http://www.irelandrecycling.ie).

Local authorities may be contacted for information on specific waste management services and companies operating in their functional areas.

As of January 2002, the companies listed in Table F.1 are known to the EPA to provide PCB removal and disposal services. The companies are listed in alphabetical order and no endorsement by the EPA of any individual company's services should be construed by its appearance on this list. Other companies who provide this service should contact the EPA for inclusion on this list. Any updates will be published on the EPA's website at [www.epa.ie](http://www.epa.ie).

**Table F.1 Waste PCB removal and disposal companies**

<b>Company</b>	<b>Telephone</b>	<b>Web</b>
Atlas Ireland	(0502) 74747 1850 504504	<a href="http://www.atlasireland.ie">www.atlasireland.ie</a>
AVR-Safeway	025 42944	<a href="http://www.avr-safeway.com">www.avr-safeway.com</a>
Cara Environmental Technology	01 260 1199	<a href="http://www.caraet.com">www.caraet.com</a>
Eurotech Environmental	+ 44 1636 611776	
Guardian Environmental Services	01 458 7270	
Irish Environmental Services	01 450 1100	
Minchem Environmental Services	01 280 4534	<a href="http://www.minchem.ie">www.minchem.ie</a>
Safety-Kleen Ireland	01 451 8800	<a href="http://www.safety-kleen.co.uk">www.safety-kleen.co.uk</a>
Shannon Environmental Services	061 708 699	

## Appendix G: List of testing laboratories

As of January 2002, the companies listed in Table G.1 are known to the EPA to provide PCB analytical services. The companies are listed in alphabetical order and no endorsement by the EPA of any individual company's services should be construed by its appearance on this list. Other companies who provide this service should contact the EPA for inclusion on this list. Any updates will be published on the EPA's website at [www.epa.ie](http://www.epa.ie).

**Table G.1 Laboratories or agents for the analysis of PCBs**

Company	Telephone
AES	+44 191 296 8500
AIControl Geochem	01 882 9983

## **Standard reporting form for PCB holdings**

### **Notification form for PCB holdings**


#### **Instructions**

The standard notification form should be used where possible. The form may be downloaded electronically from the EPA website or photocopied from this document. It should preferably be completed electronically, printed out and signed. The notification form and the notification fee (if applicable) should be sent to the following address:

**PCB Inventory**  
Environmental Protection Agency  
PO Box 3000  
Johnstown Castle Estate  
County Wexford

The notification fee payable will be published on the EPA website at [www.epa.ie](http://www.epa.ie).

Any queries in relation to completing the form should be addressed to the EPA by phone at 053-60600 or by e-mail at [info@epa.ie](mailto:info@epa.ie).

	Environmental Protection Agency PO Box 3000 Johnstown Castle Estate Co. Wexford	Tel. 053 60600 Fax. 053 60699 Web. www.epa.ie E-mail info@epa.ie	PCB Notification Form  Version 1.0 January 2002
---	--	---	---

**PCB NOTIFICATION FORM**

To be completed in full in respect of all PCB holdings in accordance with Article 15 of the Waste Management (Hazardous Waste) Regulations, 1998, S.I. No. 163 of 1998.

**Section 1**

Name of notifier	Address of notifier	tel.  fax.  e-mail.
Name of holder (if same as above, enter 'SAME')	Address of holder (if same as above, enter 'SAME')	tel.  fax.  e-mail.

**Section 2**

<b>PCBs</b>	If no PCB holdings, enter "NONE" here:	
Location (address, name or reference of building)	Number of containers:	
	Size of containers:	
	Condition of containers:	
	Total quantity (litres) (or tonnes if not liquid):	

**Section 3**

<b>Used or waste PCBs</b>	If no used or waste PCB holdings, enter "NONE" here:	
Location (address, name or reference of building)	Number of containers:	
	Size of containers:	
	Condition of containers:	
	Total quantity (litres) (or tonnes if not liquid):	

Section 4		
<b>Equipment containing &gt;5litres of PCBs (note 1)</b>	If no items of equipment containing >5L PCBs, enter "NONE" here:	
Location of equipment (address, name or reference of building)	Description of the equipment (tick) ...transformer ...capacitor ...power factor correction ...other (please specify).....	Further details:
	Quantity of PCBs contained in the equipment (litres) (note 3)	
	Concentration of PCBs in the liquid (%)	
Section 5		
<b>Equipment containing &lt;5litres of PCBs (note 2)</b>	If no items of equipment containing <5L PCBs, enter "NONE" here:	
Location of equipment (address, name or reference of building)	Description of the equipment (tick) ...transformer ...capacitor ...power factor correction ...fluorescent lighting ballast/starter ...other (please specify).....	Further details:
	Quantity of PCBs contained in the equipment (litres)	
	Concentration of PCBs in the liquid (%)	
Section 6		
Measures taken or proposed to be taken for the decontamination or disposal of PCBs, used or waste PCBs and equipment containing PCBs (note 2, note 3, note 5)		
Section 7		
<b>Notification fee</b>  (note 4)	Euro €	Office use only: Fee attached and correct (Y/N)?
Section 8		
Signed:	Print name:	Date:

## Management Plan for Polychlorinated Biphenyls (PCBs)

Note 1: This information to be provided for each individual piece of equipment which contains greater than 5 litres of PCBs or, in the case of power capacitors, such equipment where the separate elements of a combined set contain amounts of PCBs which in aggregate exceeds 5 litres.

Note 2: Holders of equipment containing <5 litres of PCBs are not obliged to notify this information to the EPA. However, the information is requested so as to quantify the total quantity of PCBs in use in Ireland.

Note 3: Holders of equipment containing >5 litres of PCBs are not obliged to notify this information to the EPA where the concentration of PCBs in the equipment can reasonably assumed to be between 0.05% and 0.005%. However, the information is requested so as to quantify the total quantity of PCBs in use in Ireland. Where such an assumption is made, holders are required to provide evidence of the reasonableness of the assumption.

Note 4: Not payable for notifications received prior to 1 September 2002. See the EPA website for publication of notification fees applicable after 1 September 2002.

Note 5: Submit plans where documented.