

**NATIONAL INVENTORY
OF
PCBs IN USE AND PCB WASTES IN STORAGE
IN CANADA**

1996 ANNUAL REPORT

PREPARED FOR THE CANADIAN COUNCIL OF MINISTERS OF ENVIRONMENT BY:

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FOREWORD

The National PCB Inventory is a compilation of PCB-containing items that are in use or in storage at various locations across Canada. The inventory changes continually as PCBs are taken out of service to be placed in storage or destroyed, and as new PCB materials are reported. In addition, new storage sites may be established, or existing sites consolidated or closed. As a result, differences between the information in this inventory and other PCB inventory information may arise from time to time. These differences should be discussed with the appropriate provincial or federal officials listed in Appendices A and B of this report.

It may be noted that the method of presentation used in this report has been modified from that used in previous annual inventory reports. This has been done in order to focus on information which users indicate is of principal interest to them.

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Ce rapport est aussi disponible en français sous le titre "Inventaire national des matières utilisées contenant des BPC et des déchets contenant des BPC en entreposage au Canada, décembre 1996, Rapport sommaire", à l'adresse suivante: Direction d'évaluation des produits chimiques commerciaux, Service de la protection de l'environnement, Environnement Canada, Ottawa, K1A 0H3.

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1. OVERVIEW

1.1 Background

The "National Inventory of PCBs In Use and PCB Wastes in Canada" is an annual report summarizing information in the national PCB inventory database that Environment Canada maintains for the Canadian Council of Ministers of the Environment (CCME). This report presents the status of the PCB inventory as of December 31st, 1996, and includes information on the amounts of PCBs destroyed in Canada since 1988.

The first national inventory of Canadian PCBs, which was published by the CCME in 1988, only gave data on PCB wastes in storage. Subsequently, in order to improve the system for reporting on PCBs in Canada, and to provide a comprehensive inventory, a national database system was established to include data on both PCBs in-use and PCB wastes in storage.

The provision of information for the national data base is a joint federal-provincial responsibility. Environment Canada supplies data on in-use PCB-containing equipment, federally regulated PCB wastes, and PCB wastes in Prince Edward Island, Saskatchewan, Yukon and the Northwest Territories. The provincial governments of Newfoundland, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Alberta and British Columbia supply data on PCB wastes in storage in their respective jurisdictions.

Data for the report are obtained from several sources. Federal and provincial PCB waste storage regulations require PCB owners to report to government on the amounts of PCB wastes in storage. Data on the amounts of PCBs in-use in electrical equipment come from two sources; voluntary reporting by PCB owners, and inspections of PCB equipment for compliance with the federal Chlorobiphenyls Regulations. Information on the amounts of PCBs destroyed was obtained from published reports on PCB destruction projects in Canada, and from the owners and operators of commercial PCB treatment and destruction systems.

The present report gives data for five categories of PCBs, namely:

- in-use askarel,
- waste askarel,
- in-use PCB-contaminated mineral oil,
- waste PCB-contaminated mineral oil, and
- other PCB wastes.

The two askarel categories represent high concentration PCB liquids. Askarels generally contain between 40% and 80% PCBs and were used in electrical transformers when insulating and fire-resistant liquids were required. Pure PCBs were also used in other types of electrical equipment such as capacitors and fluorescent light ballasts.

The two mineral-oil categories represent liquids containing low concentrations of PCBs. Mineral oil is also used as an insulating fluid in electrical transformers, and some of it has become inadvertently contaminated with PCBs. Generally, the PCB concentration in mineral oil is less than 1000 ppm.

The final category, "other PCB wastes", includes drained PCB transformers, capacitors contaminated with residual PCBs, fluorescent lamp ballasts containing PCB capacitors, and PCB-contaminated soil and other solids (e.g., wood and absorbents).

Most of the in-use and waste askarel and mineral oil in Canada is found in electrical equipment; however, liquid PCB wastes may also be stored in drums or other containers.

In reporting the inventory data, both gross and net weights are used. Net weight refers to the weight of the askarel or mineral oil itself, while gross weight is the total weight of the liquid and the electrical equipment in which it is contained. Other PCB wastes, such as soil, are reported only as gross weights.

Both gross and net weights are included in the inventory because when PCB management options are being evaluated, PCB liquids, the various types of PCB equipment, and PCB-contaminated soil may each be managed differently. For example, the entire PCB capacitor may be destroyed, whereas PCB transformers may be cleaned to recycle metal and other components. If askarel is drained from a

transformer, the transformer casing and internal components (e.g., wire, wood and paper) may still represent a PCB waste and, as such, will form part of the PCB waste inventory.

Often the gross weight of electrical equipment is unknown. However, as was outlined in previous inventory reports, the gross weight of the equipment can be estimated if the volume of fluid in the equipment is known. For transformers and other large equipment containing askarel, the gross weight in kilograms is calculated by multiplying the fluid capacity in litres by a factor of 4.5. For askarel-containing capacitors, the comparable factor is 6. PCB-contaminated mineral oil is usually referred in the terms of net weight because transformers that contain this oil are often reused after being cleaned and retrofilled with clean oil. The gross weight of a mineral oil transformer can be calculated assuming a density of 0.9 kg/litre for mineral oil.

The principal components of this inventory report are the National Inventory, the Federal Inventory, and the Non-Federal Inventory. The national inventory represents all PCBs in Canada. The federal inventory includes only those PCBs owned or controlled by federal departments, boards, agencies and crown corporations. The non-federal inventory includes only those PCBs owned or controlled by provincial and territorial governments, and the private sector. Some highlights from the 1996 inventory report are given below.

1.2 INVENTORY HIGHLIGHTS

1.2.1 National Inventory

As of December 1996, the national inventory (Tables 1-3) included:

- 9 732 tonnes (net weight) of in-use askarel (excluding fluorescent lamp ballasts) of which 8 115 tonnes were in transformers, 1 530 tonnes in capacitors, and 87 tonnes in other equipment.
- 1 726 tonnes (net weight) of in-use PCB-contaminated mineral oil of which 1 650 tonnes were in transformers, and 76 tonnes in other equipment.
- 13 187 tonnes (gross weight) of waste askarel and askarel-containing equipment consisting of 5 384 tonnes of transformers, 5 479 tonnes of capacitors, 2 273 tonnes in bulk storage, and 51 tonnes of other equipment.
- 3 270 tonnes (net weight) of waste PCB-contaminated mineral oil of which 366 tonnes were in transformers and 2 904 tonnes in bulk storage.
- 118 432 tonnes (gross weight) of other PCB wastes consisting of 105 711 tonnes of soil, 6 867 tonnes of fluorescent lamp ballasts, 2 707 tonnes of drained equipment, and 3 147 tonnes of other wastes.

1.2.2 Federal Inventory

As of December 1996 the federal inventory (Tables 1-3) included:

- 507 tonnes (net weight) of in-use askarel (excluding fluorescent lamp ballasts) of which 455 tonnes were in transformers, 29 tonnes in capacitors, and 23 tonnes in other miscellaneous equipment.
- 94 tonnes (net weight) of in-use PCB-contaminated mineral oil of which 92 tonnes were in transformers, and 2 tonnes in other equipment.
- 625 tonnes (gross weight) of waste askarel and askarel-equipment.
- 34 tonnes (net weight) of waste PCB-contaminated mineral oil.
- 2 140 tonnes (gross weight) of other PCB wastes.

1.2.3 Non-federal Inventory

As of December 1996 the non-federal inventory (Tables 1-3) included:

- 9 225 tonnes (net weight) of in-use askarel (excluding fluorescent lamp ballasts) of which 7 660 tonnes were in transformers, 1 501 tonnes in capacitors, and 64 tonnes in other miscellaneous equipment.
- 1 631 tonnes (net weight) of in-use PCB-contaminated mineral oil of which 1 557 tonnes were in transformers, and 74 tonnes in other equipment.
- 12 562 tonnes (gross weight) of waste askarel and askarel-equipment.
- 3 236 tonnes (net weight) of waste PCB-contaminated mineral oil.
- 116 290 tonnes (gross weight) of other PCB wastes.

1.3 PCB WASTE STORAGE SITES

As of December 1996, there were 2 823 PCB waste storage sites in Canada. Of these, 287 sites were federal and 2 536 were non-federal. The quantities of waste stored in these sites are divided into seven groups; ranging from sites containing less than 100 kg to sites containing greater than 10 000 tonnes (Tables 4-6).

An analysis of the distribution of waste among these storage sites indicates that almost half of the waste (64 000 tonnes) was stored at one site and that 31% of the waste (42 227 tonnes) was stored at ten sites containing between 1 000 and 10 000 tonnes.

Detailed information on waste storage sites under provincial or territorial jurisdictions can be obtained from the provincial or territorial environment offices listed in Appendix A. Information on specific sites owned or operated by the federal government can be obtained from the Environment Canada regional or district offices listed in Appendix B.

1.4 PCB WASTE DESTRUCTION

The Alberta Special Waste Treatment Centre (ASWTC), near Swan Hills, Alberta operates the only incinerator in Canada that is licensed to destroy PCBs. During 1996, 10 013 tonnes of PCB waste were destroyed. In addition, a transformer decontamination system is operated at ASWTC, and 1 114 drained askarel transformers were treated during the year to destroy residual PCBs.

The only other commercial PCB waste destruction activity in Canada in 1996 was the chemical destruction of low level PCBs in mineral oil.

TABLE 1: IN-USE ASKAREL AND MINERAL OIL INVENTORY (December 1996)

Item	Askarels (net weight, tonnes)			Mineral Oil (net weight, tonnes)		
	National	Federal	Non-federal	National	Federal	Non-federal
Transformers	8 115	455	7 660	1 650	92	1 557
Capacitors	1 530	29	1 501	-	-	-
Other equipment	87	23	64	76	2	74
Total	9 732	507	9 225	1 726	94	1 631

TABLE 2: WASTE ASKAREL AND MINERAL OIL INVENTORY (December 1996)

Item	Askarels (gross weight, tonnes)			Mineral Oil (net weight, tonnes)		
	National	Federal	Non-federal	National	Federal	Non-federal
Transformers	5 384	139	5 245	366	15	351
Capacitors	5 479	403	5 076	-	-	-
Bulk storage	2 273	75	2 198	2 904	19	2 885
Other equipment	51	8	43	0	0	0
Total	13 187	625	12 562	3 270	34	3 236

TABLE 3: OTHER PCB WASTES (December 1996)

Item	Waste (gross weight, tonnes)		
	National	Federal	Non-federal
Soil	105 711	149	105 562
Fluorescent light ballasts	6 867	1 835	5 033
Drained equipment	2 707	48	2 657
Other wastes	3 147	108	3 038
Total	118 432	2 140	116 290

TABLE 4 PCB STORAGE SITES (National)

Province		<100 kg	100 kg - 1 tonne	1 - 10 tonnes	10 - 100 tonnes	100 - 1000 tonnes	1000 - 10,000 tonnes	>10,000 tonnes	Total Sites Total tonnes
NFLD	Sites	2	15	9	15	1	0	0	42
	Tonnes	0.1	6.4	42.6	531.2	113.9	0.0	0.0	694.2
PEI	Sites	2	3	0	0	1	0	0	6
	Tonnes	0.1	0.8	0.0	0.0	158.5	0.0	0.0	159.4
NS	Sites	7	15	17	7	1	1	0	48
	Tonnes	0.2	6.6	55.0	193.4	153.3	3 087.0	0.0	3 495.5
NB	Sites	3	8	11	5	3	0	0	30
	Tonnes	0.1	5.4	42.1	216.4	701.9	0.0	0.0	965.9
QUE	Sites	117	120	120	60	6	1	0	424
	Tonnes	4.6	48.6	528.3	1 775.5	1 971.2	1 428.3	0.0	5 756.5
ONT	Sites	99	586	559	223	36	4	1	1 508
	Tonnes	2.9	257.1	1 924.9	6 627.5	8 812.4	26 042.4	64 000.0	107 667.2
MAN	Sites	7	57	30	7	2	0	0	103
	Tonnes	0.2	21.6	117.3	232.1	473.2	0.0	0.0	844.4
SASK	Sites	19	104	28	1	0	0	0	152
	Tonnes	0.5	42.3	50.5	18.0	0.0	0.0	0.0	111.3
ALTA	Sites	2	10	5	2	0	1	0	20
	Tonnes	0.1	5.6	13.3	104.3	0.0	2 064.1	0.0	2 187.4
BC	Sites	109	170	129	44	7	3	0	462
	Tonnes	4.0	71.3	507.4	1 158.4	1 547.5	9 605.8	0.0	12 894.4
YUK	Sites	11	7	2	1	0	0	0	21
	Tonnes	0.2	1.2	3.8	53.2	0.0	0.0	0.0	58.4
NWT	Sites	0	2	4	1	0	0	0	7
	Tonnes	0.0	0.8	23.4	17.2	0.0	0.0	0.0	41.4
TOTALS	Sites	378	1 097	914	366	57	10	1	2 823
	Tonnes	13.0	467.7	3 308.6	10 927.2	13 931.9	42 227.6	64 000.0	134 876.0

TABLE 5 PCB STORAGE SITES (Federal)

Province		<100 kg	100 kg - 1 tonne	1 - 10 tonnes	10 - 100 tonnes	100 - 1000 tonnes	1000 - 10,000 tonnes	>10,000 tonnes	Total Sites Total tonnes
NFLD	Sites	1	10	3	3	0	0	0	17
	Tonnes	0.0	4.8	10.8	105.7	0.0	0.0	0.0	121.3
PEI	Sites	0	0	0	0	0	0	0	0
	Tonnes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NS	Sites	3	4	3	1	0	0	0	11
	Tonnes	0.1	2.1	8.2	18.3	0.0	0.0	0.0	28.7
NB	Sites	0	5	1	0	0	0	0	6
	Tonnes	0.0	3.1	5.9	0.0	0.0	0.0	0.0	9.0
QUE	Sites	7	6	8	3	0	1	0	25
	Tonnes	0.1	3.7	53.7	79.7	0.0	1 428.3	0.0	1 565.5
ONT	Sites	5	17	20	5	2	0	0	49
	Tonnes	0.2	8.2	77.8	96.7	242.5	0.0	0.0	425.4
MAN	Sites	1	6	4	0	0	0	0	11
	Tonnes	0.0	3.3	20.6	0.0	0.0	0.0	0.0	23.9
SASK	Sites	4	75	19	0	0	0	0	98
	Tonnes	0.1	31.9	32.6	0.0	0.0	0.0	0.0	64.6
ALTA	Sites	1	7	1	0	0	0	0	9
	Tonnes	0.0	4.3	2.6	0.0	0.0	0.0	0.0	6.9
BC	Sites	26	8	13	4	2	0	0	53
	Tonnes	0.5	4.1	60.8	114.1	313.8	0.0	0.0	493.3
YUK	Sites	3	2	0	1	0	0	0	6
	Tonnes	0.1	0.2	0.0	53.2	0.0	0.0	0.0	53.5
NWT	Sites	0	1	1	0	0	0	0	2
	Tonnes	0.0	0.2	6.8	0.0	0.0	0.0	0.0	7.0
TOTALS	Sites	51	141	73	17	4	1	0	287
	Tonnes	1.1	65.9	279.8	467.7	556.3	1 428.3	0.0	2 799.1

TABLE 6 PCB STORAGE SITES (Non-Federal)

Province		<100 kg	100 kg - 1 tonne	1 - 10 tonnes	10 - 100 tonnes	100 - 1000 tonnes	1000 - 10,000 tonnes	>10,000 tonnes	Total Sites Total tonnes
NFLD	Sites	1	5	6	12	1	0	0	25
	Tonnes	0.0	1.7	31.8	425.5	113.9	0.0	0.0	572.9
PEI	Sites	2	3	0	0	1	0	0	6
	Tonnes	0.1	0.8	0.0	0.0	158.5	0.0	0.0	159.4
NS	Sites	4	11	14	6	1	1	0	37
	Tonnes	0.2	4.6	46.8	175.1	153.3	3 087.0	0.0	3 467.0
NB	Sites	3	3	10	5	3	0	0	24
	Tonnes	0.1	2.3	36.3	216.4	701.9	0.0	0.0	957.0
QUE	Sites	110	114	112	57	6	0	0	399
	Tonnes	4.5	44.9	474.6	1 695.8	1 971.2	0.0	0.0	4 191.0
ONT	Sites	94	569	539	218	34	4	1	1 459
	Tonnes	2.6	248.9	1 847.1	6 530.8	8 569.9	26 042.4	64 000.0	107 241.7
MAN	Sites	6	51	26	7	2	0	0	92
	Tonnes	0.2	18.3	96.6	232.1	473.2	0.0	0.0	820.4
SASK	Sites	15	29	9	1	0	0	0	54
	Tonnes	0.5	10.4	17.8	18.0	0.0	0.0	0.0	46.7
ALTA	Sites	1	3	4	2	0	1	0	11
	Tonnes	0.1	1.2	10.7	104.3	0.0	2 064.1	0.0	2 180.4
BC	Sites	83	162	116	40	5	3	0	409
	Tonnes	3.5	67.2	446.6	1 044.3	1 233.7	9 605.8	0.0	12 401.1
YUKON	Sites	8	5	2	0	0	0	0	15
	Tonnes	0.2	0.9	3.8	0.0	0.0	0.0	0.0	4.9
NWT	Sites	0	1	3	1	0	0	0	5
	Tonnes	0.0	0.5	16.6	17.2	0.0	0.0	0.0	34.3
TOTALS	Sites	327	956	841	349	53	9	1	2 536
	Tonnes	12.0	401.7	3 028.7	10 459.5	13 375.6	40 799.3	64 000.0	132 076.8

TABLE 7 SUMMARY OF PCB INVENTORY DATA (1984 TO 1996)

ITEM	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Askarel in use (net weight tonnes)	17 400	17 790	18 820	18 570	n/a	n/a	14 450	13 256	12 488	11 505	12 245	10 781	9 732
CMO in use (tonnes net weight)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2 043	2 160	2 233	1775	1 726
Total PCB wastes (tonnes gross weight)	n/a	n/a	n/a	n/a	n/a	n/a	130 240	141 930	143 284	127 025	133 680	141,452	134 889
Askarel waste (tonnes gross weight)	n/a	n/a	n/a	n/a	n/a	n/a	11 461	14 543	15 665	15 247	14 710	17 294	13 187
Askarel waste (tonnes net waste)	n/a	n/a	n/a	n/a	n/a	n/a	5 410	5 669	6 078	6 266	6 077	8 704	5 455
CMO waste (tonnes net weight)	n/a	n/a	n/a	n/a	n/a	n/a	5 110	4 511	4 362	3 787	3 496	3423	3 270
Other PCB waste (tonnes gross weight)	n/a	n/a	n/a	n/a	n/a	n/a	113 640	122 876	123 258	107 991	115 300	120 735	118 432
Waste storage sites	n/a	n/a	n/a	n/a	n/a	n/a	3 089	3 106	3 130	3 216	3278	2 857	2 823
Destruction (tonnes)	n/a	n/a	n/a	n/a	8 119	10 512	13 809	20822	17 632	7 507	6 698	2 939	10 013

APPENDIX A

PROVINCIAL/TERRITORIAL CONTACTS FOR INFORMATION ON PCB INVENTORIES

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Note: To obtain information on PCB inventories for Prince Edward Island, Yukon Territory, and Northwest Territories contact the Environment Canada regional office in that province or territory.

APPENDIX B

FEDERAL CONTACTS FOR INFORMATION ON THE PCB INVENTORY

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