STATUS OF PCB MANAGEMENT IN NORTH AMERICA



COMMISSION DE
COOPÉRATION ENVIRONNEMENTALE

COMISIÓN PARA LA
COOPERACIÓN AMBIENTAL

COMMISSION FOR
ENVIRONMENTAL COOPERATION

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Retail Price: $20.00 US
Diskettes: $15.00 US

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This publication was prepared for the Secretariat of the Commission for Environmental Cooperation (CEC) as a background paper. The views contained herein do not necessarily reflect the views of the CEC, or the governments of Canada, Mexico or the United States of America.

ISBN 0-921894-28-7
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Published by Prospectus Inc.

Printed in Canada

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COMMISSION FOR ENVIRONMENTAL COOPERATION

A NORTH AMERICAN APPROACH TO ENVIRONMENTAL CONCERNS

Three nations working together to protect the environment

The **Commission for Environmental Cooperation** (CEC) was established by Canada, Mexico and the United States in 1994 to address transboundary environmental concerns in North America. While the idea to create such a commission originated during the negotiations of the North American Free Trade Agreement (NAFTA), it derives its formal mandate from the North American Agreement on Environmental Cooperation (NAAEC).

The NAAEC builds upon and complements the environmental provisions established in NAFTA. It creates a North American framework whereby goals related to trade and the environment can be pursued in an open and cooperative way.

In broad terms, the NAAEC sets out to protect, conserve and improve the environment for present and future generations. How? The parties to the Agreement set out the following objectives:

- to protect the environment through increased cooperation;
- to promote sustainable development based on mutually supportive environmental and economic policies;
- to support the environmental goals of NAFTA and avoid creating trade distortions or new trade barriers;
- to strengthen cooperation on the development of environmental laws and enhance their enforcement; and
- to promote transparency and public participation.

In signing the NAAEC, the governments of Canada, Mexico and the United States committed themselves to a core set of actions, including:

- reporting on the state of the environment;
- striving for improvement of environmental laws and regulations;
- effective enforcement of environmental law; and
- publication and promotion of information.

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MISSION STATEMENT

The CEC facilitates cooperation
and public participation to foster conservation,
protection and enhancement of the
North American environment for the benefit
of present and future generations,
in the context of increasing economic, trade and
social links between Canada, Mexico and
the United States.

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PREFACE

Polychlorinated biphenyls (PCBs) are a class of compounds that, once noted for their utility in electric equipment and other applications, are now notable since all three North American countries have regulations or policies specifically directed towards their control and management.

For nearly fifty years, until 1977, PCBs were manufactured by one U.S. company for such uses as dielectric fluid in electrical transformers, capacitors, and light ballasts, as well as uses including hydraulic fluids and plasticizers. With the advent of PCB regulations in the United States in the mid-70's, manufacture of PCBs in North America came to an end. Although PCBs are no longer produced here, much of the PCB-containing equipment has not reached the end of its useful life, and continues to be used. Storage and disposal capacity is uneven throughout the region, resulting in highly variable practices and potential for exposure to the environment.

During 1995, at the request of the three countries, the CEC commissioned three background reports on the status of the management and control of PCBs in Canada, the U.S., and Mexico, and a summary report to highlight the most significant PCB management issues. The main project objectives were to determine:

- what amount of PCBs remains in each country;
- what disposal options exist in each country; and
- what barriers and opportunities for PCB disposal exist in North America?

In commissioning these studies, the CEC hopes that they will continue to be used to focus discussions among Canada, the U.S. and Mexico in addressing issues that are determined to be of national and regional priority.

At a meeting in October 1995, the North American Environment Ministers agreed to a resolution entitled "Sound Management of Chemicals", and agreed to embark on a program of management and control of certain chemicals. PCBs were specifically named in the resolution. The three governments have begun to develop a regional action plan for PCBs, and have been able to use this series of background reports as reference materials.

The CEC would like to express appreciation to the governmental agencies who have been cooperating and continue to cooperate in this area: Environment Canada, the Environmental Protection Agency (EPA) and the *Instituto Nacional de Ecologia (INE)*, National Institute of Ecology, and also to the contractors who have worked on this project with us: Ross & Associates Environmental Consulting Ltd., of Seattle, Washington, ERM-México, S.A. de C.V., of Mexico City, and Proctor & Redfern, Ltd., of Hamilton, Ontario.

These documents do not necessarily reflect the views of the governments of Canada, Mexico or the United States.

Lisa Nichols, Program Manager,
Technical Cooperation, CEC
Montreal, Quebec, Canada

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SUMMARY

STATUS OF PCB MANAGEMENT IN NORTH AMERICA

COMMISSION FOR
ENVIRONMENTAL COOPERATION

MONTREAL, CANADA

JUNE 1996

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ACRONYMS

CEC	Commission for Environmental Cooperation
CEPA	Canadian Environmental Protection Act
CFE	*Comisión Federal de Electricidad* (Federal Electricity Commission)
EPA	Environmental Protection Agency
INE	*Instituto Nacional de Ecología* (National Institute of Ecology)
LGEEPA	*Ley General del Equilibrio Ecológica y la Proteccion al Ambiente* (General Law of Ecological Equilibrium and Environmental Protection)
NAFTA	North American Free Trade Agreement
OECD	Organization for Economic Cooperation and Development
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
SEMARNAP	*Secretaría del Medio Ambiente, Recursos Naturales y Pesca* (Secretariat for the Environment, Natural Resources and Fisheries)
TSCA	Toxic Substances Control Act



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I. OVERVIEW

The United States, Canada, and Mexico have each developed unique approaches for protecting human health and the environment through a series of environmental laws that control pollutant uses and releases, manage the treatment and disposal of wastes, and guide land use activities. These policies have developed independently, based on each country's particular set of circumstances.

With the creation of the North American Free Trade Agreement (NAFTA), concerns regarding potential disparities between environmental management in the three countries gave rise to the North American Agreement on Environmental Cooperation (NAAEC) and the Commission for Environmental Cooperation (CEC), which was charged with a multi-faceted mandate of promoting cooperation in the conservation of the North American environment. For the first time, critical environmental issues that each country had faced individually could now be addressed from a North American perspective.

Each member country — the United States, Canada, and Mexico — has attempted, to various degrees, to protect its citizens and environment from the risks associated with PCBs, even as PCBs remain in use and in the environment of each country. The incentives for disposing of PCBs, and the capacity to manage PCB disposal varies greatly between the countries. The range of key issues that could potentially drive a North American strategy for PCB management need to be understood.

The CEC's PCB management study has a two-phased approach. In the first phase, the CEC commissioned background papers on the status of PCB management in each country.[1] These background reports, which are available from the CEC, should be used to gain a more detailed understanding of each country's PCB situation, including regulations, inventory, and management and disposal capacity.

The present paper represents the second phase of the study. It highlights such issues as key regulations, inventory, and PCB capacity in order to compare proper PCB management in each country, including the incentives, or disincentives for PCB management and disposal. This information should help to clarify the key issues involved in a PCB management strategy for North America.

Two basic questions form the discussion throughout the document. First, what is each country's responsibility for PCB management and disposal, and second, what is the role of an open border policy in reaching shared management objectives? Throughout this analysis it is assumed that member countries enforce their own environmental laws.[2]

---

[1] Ross & Associates Environmental Consulting, Ltd., *Status of PCB Management in the United States*, August 1995; Proctor & Redfern, Limited, *Status of PCB Management in Canada*, September 1995; ERM-México, *Status of PCB Management in Mexico*, August 1995.

[2] This report does NOT evaluate the extent to which any member country enforces its laws regarding PCB use, management, and disposal, and should not be used to draw conclusions regarding the adequacy of enforcement in any country.



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Transboundary issues — importing and exporting PCBs for proper management and/or disposal between the three countries — may impact a North American PCB management strategy. At the same time, a North American PCB management strategy will require commitment from the three countries to work toward a shared goal, with an open border policy as only one of several policy tools worthy of consideration. The status of the United States position on importing PCBs for disposal is pivotal to the entire discussion of transboundary movement of PCBs. The United States has both the largest quantity of PCBs and the largest PCB disposal capacity of the three countries. Its borders are currently closed to import and export of PCBs except through a case-by-case regulatory exemption process. The U.S. Environmental Protection Agency (EPA) is in the midst of a rulemaking procedure that could alter the manner in which PCBs are regulated in the United States and whether or not they are allowed to be imported and/or exported for management and disposal.[3]



[3] EPA's March 1996 PCB import rule no longer requires a regulatory exemption or case-by-case approval for imports of PCBs in concentrations greater than 50 ppm if certain conditions are met.

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II. BACKGROUND: PCB STATUS IN THE UNITED STATES, CANADA, AND MEXICO

Polychlorinated biphenyls (PCBs) are a class of highly toxic chemical compounds that bioaccumulate in the environment, and are recognized as potential carcinogens. Until the 1970s, PCBs were used extensively in electrical equipment such as transformers, capacitors, and light ballasts, as well as in hydraulic fluids, plasticizers, and other items.

Within North America, only the United States produced PCBs. From 1929 to 1977 Monsanto Company, the sole manufacturer of PCBs in the United States, produced 700,000 tons (1.4 billion pounds) of pure PCBs, of which 75,000 tons were exported and 625,000 tons (1.25 billion pounds) were used in the United States. Approximately 44,000 tons (88 million pounds) were exported to Canada. Mexico imported 11,000 to 22,000 tons (22 — 44 million pounds) from the United States and Europe. Because PCBs are used in combination with other substances in a wide range of insulating and electric equipment and other industrial purposes, it is difficult to determine the total volume or locations of material — in use or as contaminated soil — that may have been in contact with PCBs. However, it is significantly higher than the amount of pure PCBs originally manufactured.

Understanding the PCB situation from a North American perspective requires a general understanding of the approximate volumes of PCBs that were originally present in each country and to get a sense of how far each country has come in ridding its environment of PCBs. Moreover, an understanding of the regulatory framework for manage-ment and disposal options is needed to get a sense of each country's capability to manage, treat, and destroy its remaining PCBs. This section highlights each country's PCB situation, including regulations, remaining PCB inventory, disposal options, status on importing and exporting PCBs for disposal, and observations on each country's PCB situation drawn from this background information. It also summarizes the role of international agreements between the three countries that enable transboundary movement of hazardous materials including PCBs.

In order to relate the overall PCB context in each country, **Table 1** compares some of the primary issues between the three countries. It is important to understand, however, that inventory information in each country is calculated differently, which makes a direct comparison difficult.



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Table 1: Comparison of PCB Management Status in North America

	United States	Canada	Mexico
Responsible Agency	Environmental Protection Agency (EPA)	Environment Canada; Provincial Ministers of Environment	Secretariat of the Environment, Natural Resources, and Fisheries (SEMARNAP), specifically the National Institute of Ecology (INE)
Primary PCB law(s)	Toxic Substances Control Act §6(e); and 40 CFR 761	Chlorophenyl Regulations; PCB Waste Export, Storage, Treatment and Disposal Regulations; Export/Import of Hazardous Waste Regulations, Transport of Dangerous Goods Regulations; Provincial Regulations	Hazardous Waste Regulation of the General Ecology Law
Separate laws / regulations for PCBs	Yes	Yes	No (under development)
Phased out certain items	Yes	Yes	No
Use restrictions	Yes	Yes	No
Import allowed	Yes*	Yes, for destruction	No
Export allowed	No, except for equipment authorized for use, with importing country's agreement	Yes for PCB units to U.S. only if U.S. has given prior consent; No to any other countries (Not allowed due to Interim Order)	Yes
Disposal / Management options (permitted and available)	Incinerators Mobile treatment/ incineration Landfills Alternate thermal	Incinerator Mobile treatment and incineration	Export
• Incineration capacity	Yes	Yes	No
• Landfill capacity	Yes	Yes	No
Additional disposal facilities pending	Yes	Yes	Yes
Decontamination capabilities	Yes	Yes	Yes
Commercial storage reauire-ments and time limit	Yes	Commercial storage not usually allowed; no storage time limits	No
Labelling requirements for PCBs in use	Yes	Yes (voluntary)	No
Transportation requirements	Yes	Yes	Yes
Emergency planning	Yes	Yes	Yes
Inventory	No	Yes	No (under development)
Public education materials and programs	Yes	Yes	No

*As of March, 1996 this rule has been revised to allow import of PCBs for destruction under certain conditions.

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A. UNITED STATES

The United States has devised the most comprehensive and complex regulatory structure for PCBs of any of the North American countries. The Toxic Substances Control Act (TSCA) has a separate section devoted exclusively to PCBs, and PCB rules comprise more than 70 pages of the Code of Federal Regulations. Under this regulatory regime, PCBs are banned from manufacture, import, export, and use except under limited circumstances. The EPA has determined that no unreasonable risk exists for any of the remaining allowed uses of PCBs, and certain types of equipment with PCBs have been phased out.

PCBs are regulated under a three-part concentration-based hierarchy, based on the concentration of PCBs present in equipment. PCBs at concentrations less than 50 ppm are largely unregulated. Equipment with PCB concentrations between 50 - 500 ppm have some regulatory requirements, and equipment with PCBs in concentrations greater than or equal to 500 ppm has the most stringent regulations; these include limited disposal options, and storage, marking, location, and recordkeeping requirements. Regulations dictate the types of disposal allowed for liquid PCBs and for equipment contaminated by PCBs. There are limits on the maximum amounts of PCBs facilities are permitted to handle, which are listed in permits or based on practical operating limits. In all cases, the EPA has determined that the upper limit does not pose an unreasonable risk to human health or the environment.

The EPA is currently in the process of modifying the PCB rules to help increase the pace of PCB disposal in the United States. The proposed rules, issued in December 1994, make major changes to the types of disposal options available and the items that fall under regulatory control.[4] The public comment period closed in May 1995, and the EPA held an additional public hearing in June to respond to comments. The EPA is developing the final rule.

What amount of PCBs remains? Of the 1.4 billion pounds of pure PCBs produced by Monsanto, the United States used about 625,000 tons (1.25 billion pounds) in dielectric fluid for electrical equipment and for other uses. In 1976, the EPA estimated that 250,000 tons (500 million pounds) had already entered the environment and that 375,000 tons (750 million pounds) remained in electrical equipment. By 1988, the EPA estimated that 141,000 tons (282 million pounds) of pure PCBs still remained in use. A private inventory of electrical equipment estimated that approx-imately 28 million equipment units, containing a total of 166 million pounds of PCBs, remained in service in 1988.[5] Other remaining PCBs are likely located in fluorescent lamp ballasts manufactured before 1979, and a variety of other equipment that was manufactured with PCBs. The 1988 inventory showed the following types of electrical equipment with PCB concentrations above 50 ppm:

[4] 59 FR 62788 - 62877, December 6, 1994.

[5] Resource Planning Corporation, Appendix A: Estimated 1988 PCB Equipment Inventory (Final Report), October 1988.

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Askarel Transformers	74,300 items ≥ 500 ppm;	total lbs PCBs =	121,000,000
Mineral Oil Transformers	2,590,000 items 50-500 ppm;		
	263,700 items ≥ 500 ppm	total lbs PCBs =	313,900
Large PCB Capacitors	1,460,000 items ≥ 500 ppm;	total lbs PCBs =	45,500,000

In addition to PCBs remaining in use, the EPA estimates that 34 million cubic yards of soils are contaminated with PCBs.

The EPA has not conducted a comprehensive PCB inventory since the 1980s, and only began tracking disposal data in 1990. Therefore, it is difficult to determine an accurate inventory of pure PCBs or equipment with PCBs remaining in 1995. Since the EPA began tracking PCB disposal, approximately 5.7 billion pounds of PCB wastes have been disposed of at TSCA permitted facilities. This includes 104,000 transformers and 280,000 large capacitors over the four-year period. At the end of 1993, 57 million pounds of PCB waste was in storage awaiting disposal. PCB concentration data is not reported, so all disposal data reflect the total weight of the contaminated material, not the quantity of pure PCBs.

What options exist for disposal? Widespread disposal options exist in the United States. Four fixed incinerators are permitted to handle PCBs. An additional incinerator is undergoing test burns during 1995. Other disposal options include a mobile incinerator as well as seven chemical waste landfills. Decontaminating and recycling services are also available. Five companies are permitted for mobile or fixed chemical dechlorination of low level contaminated items; four facilities are permitted for physical separation; three facilities are permitted for transformer decommissioning; and three facilities are permitted for fluorescent light ballast recycling. **Figure 1** shows the locations of the management and disposal facilities in the United States. Disposal costs in the United States are, in general, less expensive than in Canada. Pricing information on several U.S. companies was obtained on the proviso that the company names not be identified. Apparently, the U.S. market is very competitive and companies are unwilling to quote prices unless it is for a specific job. These costs were then compared to recent prices from the Swan Hills facility in Alberta. Of the three U.S. firms that supplied pricing data, one U.S. firm had considerably higher pricing than the Swan Hills facility, one had pricing slightly less than Swan Hills and one had pricing considerably less than Swan Hills. No transportation costs were included in this comparison.

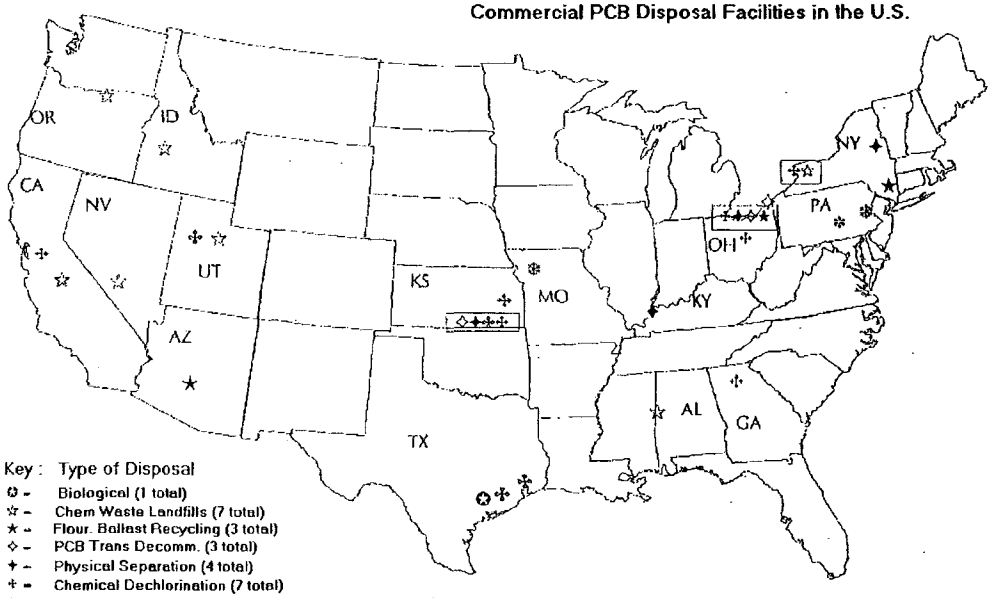
Major consolidation is occurring in the PCB disposal and management industry along with the rest of the hazardous waste disposal industry in the United States. For PCB treatment disposal options, one company — Rollins Environmental Services — controls three of the four existing incinerators. The remaining incinerator is owned by Chemical Waste Management, which also controls most of the landfills that accept PCB wastes. Actual disposal volumes and quantities of PCB items disposed of on an annual

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basis continue to increase each year; however, large fluctuations in the data appear linked to changes in regulations that make disposal a more attractive option than ongoing use. For example, PCB container disposal surged to almost five million containers in 1991 compared to the typical annual disposal of 160,000 - 180,000 containers. The EPA attributed this exponential increase to companies that reclassified their units rather than install enhanced electrical protection, thereby generating a large volume of oil that would have been containerized for disposal.

Virtually all U.S. treatment and disposal facilities are currently operating far below their permitted capacities. Although not all facilities are willing to provide data regarding the actual amount of PCB waste they handle, the existence of excess capacity is well accepted throughout the PCB disposal industry. In some cases, particularly for incinerators that are permitted to handle RCRA hazardous waste as well as PCBs, the capacity available for PCBs is now being allocated to other hazardous wastes if sufficient PCBs are not available.

Commercial PCB Disposal Facilities in the U.S.



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Is PCB Import/Export Allowed? Under U.S. current rules, PCB imports and exports are banned unless the EPA grants a regulatory exemption. On 26 October 1995, the EPA granted a request for enforcement discretion to S.D. Myers to import PCBs from Canada to the U.S. for disposal, effective 15 November 1995 until the effective date of the final PCB import rule, not to exceed 31 December 1997. The EPA noted that the grant of enforcement discretion applies only to S.D. Myers, the only company to make such a request, but that other similarly qualified companies may apply for the same discretion.

The EPA temporarily allowed the import and export of PCBs for disposal in its "Open Border Policy" in 1979. This policy expired in 1980 in order to encourage other countries to develop their own PCB disposal capacity.

The EPA's proposed PCB rule changes include modifications to the current import/export rules. The EPA proposed to modify the process for granting import/export petitions to move away from a regulatory exemption. Under the proposed rules, imports for disposal would still be allowed only on a case-by-case basis and could occur at the EPA's initiative or in response to a petition based on a new two-part test: (1) the activity was in the "interest of the United States" (which was not specifically defined), and (2) the activity would not result in unreasonable risk of injury to health or the environment. Export decisions would be allowed if the receiving country had an international agreement for transboundary disposal of PCBs unless the EPA believed that the PCBs would not be properly managed in that country.[6]

Observations on PCB Management in the United States. **All remaining phaseout deadlines pertaining to PCB-containing equipment have expired in the United States. Adequate storage and disposal capacity is available throughout the country. Thus, the primary remaining issue is one of pace. The EPA is attempting to modify the PCB regulations to make disposal a more attractive option for those PCBs remaining in service. It is also exploring incentives through its enforcement authorities that would reward facilities that remove and then provide for disposal of PCBs more rapidly. Any new rules issued regarding the process for importing and/or exporting PCB wastes for disposal will also affect the volume, pace, capacity, and price of PCB disposal in the United States.**



[6] The EPA's decision to change the import/export procedure may be challenged by parties that question whether the EPA has the statutory authority to make the proposed regulatory changes.

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B. CANADA

In Canada, PCBs are regulated under a series of regulations promulgated under the Canadian Environmental Protection Act (CEPA). The Chlorobiphenyl Regulations, first issued in 1977, are similar to the United States' PCB rules promulgated under TSCA. The Chlorobiphenyl Regulations prohibit the manufacture, sale and import of PCBs for any use (importation of PCBs for destruction is allowed), restrict the allowable use of PCBs in products, set a regulatory concentration limit of 50 ppm, and specify the concentration and amount of PCBs that can be released legally to the environment.

Federal storage regulations impose storage requirements for PCBs, and apply to all PCB owners. Many provinces also have specific storage regulations for PCBs. The Transportation of Dangerous Goods Act places requirements on PCB transportation, including packaging specifications, manifesting, and training and safety. Some provinces also have additional regulatory requirements for transporting PCBs.

Canada has few commercial storage facilities, due in part to a reluctance to approve such facilities and public opposition to consolidated sites. Consequently, very little consolidation has been allowed for PCBs taken out of service, and as a result, Canada has over 3,000 storage sites throughout the country. The regulations do not set limits on the amount of time such material can remain in storage.

What amount of PCBs remains? Unlike the United States, Canada conducts an annual nationwide PCB inventory. There is a joint federal-provincial responsibility in Canada to compile PCB inventory data. In general, Environment Canada tracks in-use PCBs and the provinces track PCB wastes in storage. Environment Canada has been publishing annual PCB inventory (in-use and in-storage) reports since 1988. At the end of 1993, Environment Canada's nationwide PCB inventory included approximately 50,000 tons (101 million pounds) of PCBs and PCB material in use (excluding fluorescent lamps), and 140,000 tons (280 million pounds) of PCBs, PCB material, and contaminated soil in storage. There is presumably a large but relatively unknown quantity of fluorescent lamp ballasts in use not included in the national inventory.

What options exist for disposal? Until recently, there have been very limited readily accessible PCB destruction options available in Canada. Several attempts at siting PCB incineration facilities have failed as a result of strong public opposition. Two mobile incineration projects have been completed. A third project, scheduled for three sites in Quebec, is soon to be implemented. The Swan Hills facility in Alberta (with a capacity of approximately 55,000 tons per year) is the only fixed PCB incinerator in Canada. The Alberta government recently sold its share of the facility. Until January 1995, the Swan Hills facility was only allowed to accept PCBs from within Alberta. However, the policy changed in February 1995 and it will now be able to accept waste from throughout Canada. Disposal prices at Swan Hills have generally been higher than in the United States, and the facility currently operates below capacity.



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Options for the treatment of PCB-contaminated mineral oil (for reuse) have been available and widely used in Canada, primarily through mobile dechlorination units operated by PCB service companies. The decontamination of transformers, for reuse, that contained PCB-contaminated mineral oil is also widely practiced. Mobile decontamination services for high concentration PCB equipment, although available, have not been popular, partly due to the lack of readily available (until recently) incineration facilities for the destruction of the askarel liquids. There is one landfill that accepts PCB contaminated soils, and it is located on the island of Montreal.

Is PCB Import/Export Allowed? Canada's Waste Export Regulations prohibit the export of PCB waste to all countries except the United States. Export to the United States is allowed only when the U.S. EPA has given prior consent to the import. The Alberta border is not open to importation of PCBs from outside Canada to the Swan Hills facility, and the federal Chlorobiphenyl Regulations prohibit import except for destruction.[7]

Observations on PCB Management in Canada. **The opportunity for PCB disposal in Canada will change now that Swan Hills, the only permanent commercial incinerator in Canada approved for PCB destruction, is able to accept PCBs from throughout the country. Although the opening of Swan Hills gives Canada sufficient capacity to handle its PCBs, it is unclear what impact that decision will have on the pace of PCB disposal in Canada. The pace of disposal will be influenced by the cost of disposal at Swan Hills, the incentives to move PCBs out of storage to disposal, and the cost and complexity of transporting PCBs across provinces to Alberta. The two successful mobile incineration projects (Goose Bay and Smithville), and the proposed Quebec mobile incineration projects all had large quantities of PCBs spilled or stored in or near the host communities that provided a needed incentive for obtaining community agreement to these temporary projects. Public opposition to siting hazardous waste incineration facilities is high in Canada. It appears unlikely that new facilities will open in the near future, except for localized mobile treatment units.**



[7] On 20 November 1995, in the wake of a decision by the EPA to grant enforcement discretion to S.D. Myers to import PCBs from Canada to the United States for disposal, the Minister of the Environment signed an interim order under the Canadian Environmental Protection Act to ban the export of PCB waste to the U.S. for at least two years. The future of the Interim Order is uncertain.

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C. MEXICO

Mexico has used much smaller quantities of PCBs than the United States and Canada, and it has not developed a specific regulatory structure to control PCB handling, management, and disposal separate from general hazardous waste management rules. In Mexico, PCBs are regulated under the *Ley General de Equilibrio Ecológica y la Protección al Ambiente (LGEEPA)*, Hazardous Wastes Regulation of the General Law of Ecological Equilibrium and Environmental Protection. PCBs are considered a hazardous waste under Mexican Law, and therefore all obligations of hazardous waste generators apply to PCBs.

These provisions include special Technical Ecological Norms which regulate PCB handling and disposal. Any entity that has PCBs and will eventually have to dispose of them must submit a report to the *Instituto Nacional de Ecología (INE)*, National Institute for Ecology.[8] However, most industries have not submitted the form. Transformer repair shops do not need specific permits for handling PCBs, and there are no labelling or spill control requirements. Many officials fear that PCBs are being stored inappropriately and likely disposed of in uncontrolled ways.

Investigations conducted by the Consultant observed several power station sites with leaking transformers. Because there are no labelling requirements in Mexico, it is not possible to demonstrate easily that these units were leaking PCBs, however it does raise questions regarding adequate safeguards for PCBs remaining in use or in storage in Mexico.

What amount of PCBs remains? According to the official report from *INE* Mexico has 8,800 tons of liquid PCBs stored and in transformers, and there is no information on the amount of PCB-contaminated material. The *Comisión Federal de Electricidad (CFE)*, Federal Electricity Commission, has approximately 2,400 tons (4.9 million pounds) of PCBs in electrical equipment spread out over the country. Mexico may have over 10,000 transformers or capacitors with PCBs within industrial complexes.

What options exist for disposal? Mexico has no facilities for final disposal of PCBs. One incinerator was built but never authorized to operate. The only existing, authorized treatment facility in Mexico is a mobile treatment unit for decontaminating oils with less than 5,000 ppm of PCBs. One company plans to introduce a mobile incineration unit in 1996 that could destroy PCBs at a lower cost than overseas export. Several other companies have expressed interest in building PCB disposal capacity in Mexico.

Is PCB Import/Export Allowed? PCBs may be exported for disposal. Three companies are authorized to export PCBs. Most recently, 600 tons (1.2 million pounds) of PCBs were shipped

[8] *INE* is part of the *Secretaría del Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP)*, Secretariat of the Environment, Natural Resources, and Fisheries, the agency responsible for Mexico's environmental protection.



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to an incinerator in Finland.[9] The import of PCBs to Mexico is prohibited. The President of *INE* requested that the United States EPA consider allowing PCB imports from Mexico for incineration in the United States because the volumes of PCBs in Mexico do not justify the investment in incineration equipment, particularly with the financial difficulties in Mexico, and in light of the excess capacity in the United States.

Observations on PCB Management in Mexico. Mexico faces a dilemma in its PCB disposal efforts. It has not established a comprehensive inventory of remaining PCBs nor developed internal management capabilities for PCB disposal. Although *INE* has a goal of destroying PCBs, there are no facilities available in Mexico, and as a result, a small amount of PCBs are exported overseas to Europe for disposal. This fledgling export business is a direct result of the lack of disposal options within Mexico. PCBs have not received as much attention in Mexico as they have in the United States and Canada, and limited public information on PCBs is available to protect against improper handling. Some companies are attempting to develop PCB treatment and disposal capabilities within Mexico to overcome the current reliance on export. The Mexican authorities are analyzing a program to regulate, sample, label, and handle PCBs.



[9] As of March 31, 1996, *INE* had granted permits for the exportation of 1,528 metric tonnes of PCBs. Of this amount, 1,350 metric tonnes were exported to Finland and 178 metric tonnes to England for incineration.

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D. International Agreements and Import/Export

Several multilateral and bilateral agreements address transboundary shipments of hazardous waste, including PCBs. These agreements establish a framework for domestic regulation of such hazardous waste which recognizes the right of a country to ban the export or import of hazardous waste but allows the transboundary movements of such waste subject to prior notification and acceptance of the shipment by the importing country. The regulatory framework so established also recognizes the sovereign right of a country to ban or deny the import or export of any waste shipment. Therefore, the status of domestic regulations in Canada, the United States and Mexico on the import and export of PCBs is crucial to any policy purporting to allow or encourage transboundary shipment of PCBs for disposal.

The primary international agreement on transboundary hazardous waste shipments is the 1989 Basel Convention.[10] This agreement provides, *inter alia*, that each party shall reduce the generation of waste, that adequate disposal facilities should be made available "if possible" within the country where waste is produced, and that waste management should be done so as to prevent pollution. Under Articles 4(5) and 11 of the Convention, waste shipments between member and non-member countries are prohibited unless a separate bilateral agreement between a member and non-member country authorizes such shipments. Although Canada and Mexico are parties to the Basel Convention and the United States is not, the United States has signed separate bilateral agreements with Canada and Mexico which cover movements of hazardous waste movements between it and either of these countries.[11]

Both of these agreements conform to the spirit of prior notification and consent of the importing state for any shipment of hazardous waste. The 1986 agreement between Canada and the United States provides for a 30-day prior notice. However, the absence of a response from the regulatory authorities of the importing country within the 30-day delay is considered as tacit consent. The 1987 Annex III to the United States-Mexico agreement provides for a mandatory prior notice to the country of import who shall respond within 45 days. This Agreement does not provide for tacit consent if no response is provided in the 45-day time period.

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[10] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, March 22, 1989, (1992) C.T.S. 19.

[11] Agreement Between the Government of Canada and the government of the United States of America Concerning the Transboundary Movement of Hazardous Waste, October 28, 1986, (1986) C.T.S. No. 39; Annex III to the Agreement Between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area: Agreement of Cooperation Between the United States of America and the United Mexican States Regarding the Transboundary Shipments of Hazardous Wastes and Hazardous Substances, November 12, 1986 26 I.L.M. 16-37 (1987).



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All three countries are members of the Organization for Economic Cooperation and Development (OECD). In September 1995, the Third Conference of Parties to the Basel Convention adopted an amendment banning the export of hazardous waste from an OECD member (including Liechtenstein) to non-member developing countries. However, this ban would not apply to PCB shipments between the United States, Canada and Mexico, since all are OECD members.

Although NAFTA is designed to promote free, uninhibited trade between the three countries, it also recognizes the supremacy of the Basel Convention, the 1986 Agreement between Canada and the United States, and the 1983 La Paz Agreement between the United States and Mexico in case of any inconsistency between NAFTA and these environmental agreements.[12] In fact, the Canada-U.S. and Mexico-U.S. hazardous waste agreements are predicated upon the free movement of hazardous waste between the parties subject to prior notice and consent by the importing country. The Basel Convention principles that disposal facilities be established within the country generating waste and that transboundary movement of waste shall be reduced to the minimum do not apply to bilateral movements of hazardous waste between the United States and Mexico or Canada because these would be governed by the principle of freedom of movement, subject to notification and consent of the country of import.

Existing rules of conventional international law thus allow for the establishment of a "regulated" trade market for the disposal of PCBs in North America. The only requirements limiting free trade of hazardous waste are the procedural rules of prior notification and consent. These rules are incorporated into the domestic law of the three NAFTA parties. Discretionary consent has led to the emergence of domestic policy and law banning or restricting the import of PCBs in the United States. If the NAFTA parties agree to "open borders" for PCB disposal, they will have to replace these discretionary bans or restrictions allowed by the above-mentioned international instruments, by PCB management, handling, shipping and disposal standards enacted by the responsible regulatory agencies. Each country would then issue a consent to the import of PCBs for disposal purposes, insofar as each shipment complies with these standards.



[12] North American Free Trade Agreement (NAFTA), December 17, 1992, Article 104(1)(c) and (d), and Annex 104.1.

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III. NORTH AMERICAN PERSPECTIVE ON PCB MANAGEMENT

The amount of PCBs in North America is essentially fixed since they are no longer manufactured or imported. Since PCBs are persistent and bioaccumulative, adequate storage prevents their entry into the environment but does not provide a permanent solution. All three countries have at least one PCB disposal option. Given sufficient time, each country, using their available options, would be able to destroy all of their PCBs. A coordinated North American PCB strategy would make national PCB management goals more readily achievable and have the overall effect of reducing the amount of PCBs released to the environment.

A North American PCB management strategy will require a commitment from each of the three countries to work collectively toward a common policy goal. What is needed first is the articulation of a goal for a North American PCB management strategy that meets the needs and objectives of the three governments. A PCB management strategy could be developed to meet those goals based on observations drawn from the PCB situation in each country and the issues that arise when viewing PCBs from a North American perspective.

This section frames key questions to guide consideration of such a North American PCB management goal and subsequent strategy. The previous observations about the status of PCB management in each country have obvious implications for developing a shared North American strategy for PCB management. Together these questions and observations can guide the appropriate actions to achieve its PCB target objective, and in particular will provide focus on the role of an open border policy as part of those actions.

A. FRAMEWORK FOR A NORTH AMERICAN PCB MANAGEMENT STRATEGY

Four key questions shape development of a North American PCB management strategy, including the objectives of such a strategy and the obligations of each country in helping to achieve those objectives.

1. What is the desired goal for PCB management in North America? For example, various goals could include:

- Remove and destroy all PCBs by a certain date;
- Eliminate all PCBs in use and move them into safe storage for eventual destruction at a market-driven pace;
- Inventory all PCBs in use and develop a strategy for removal, storage, and destruction at the end of the equipment's useful life;
- Inventory all PCBs in storage and assure their safe storage until they can be disposed of; and
- Others?

2. What pace of disposal is satisfactory? For example, different "paces" could include:

- Destroy remaining PCBs by a certain date;
- Allow removal and destruction at a market-driven pace with or without any additional incentives or disincentives to affect pace;
- Remove PCBs from sensitive locations;
- Allow PCBs to remain in use for the remainder of the useful life of the equipment; and
- Others?



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3. What is each country's responsibility to stimulate and encourage disposal within its own borders, and should the objective for PCB disposal be the same for each country? For example, allocations of individual and shared responsibility could include:

- Responsibility rests with each country for its own disposal at its own pace;
- Rely on existing capacity and market-driven decisions for future capacity based on an open border policy;
- Establish a limited time window for an open border policy;
- Share capacity based on agreed-upon reciprocities, such as all three countries have some capacity, or only between countries with capacity and those that have no capacity, or between countries that have capacity;
- Open borders on a case-by-case basis; and
- Others?

4. What actions would help achieve the objectives of a transcontinental PCB management strategy?

- What other actions might be necessary to supplement a change in border status to ensure that the PCB management goal is indeed met? For example, additional actions might include a time-certain storage limit or a tax on PCBs in storage or in use.
- If the U.S. border stays closed on a case-by-base basis, what criteria should the U.S. use to determine its interests?

These questions should be used in conjunction with the observations on PCB management to help guide development of a strategy that recognizes and enhances the ability of each country to meet its responsibility for proper PCB management. That responsibility may or may not include an open border policy for PCB disposal, depending on how the countries decide to combine or share their responsibilities.

B. Policy Observations on North America's PCB Management

When looking at PCB management from a North American perspective, as opposed to within each country's borders, a complex picture emerges. It is a picture that needs discussion between the countries, especially if any shared responsibilities are seen to exist between the three countries to achieve common North American PCB management objectives. While the question of whether an open border policy is necessary to achieve common objectives is perhaps the most obvious question in need of a three-country dialogue, there are others that also deserve consideration. Below, some of the primary observations and policy questions are highlighted.

Level Playing Field. The disparity between the three countries in terms of the quantity of PCBs originally in use, the amount removed from service, their investment in treatment and disposal capacity, and the comprehensiveness of regulations is quite apparent.

> *Discussion Question.* How should a shared North American strategy account for different levels of investment and regulatory consideration each country has made to develop PCB management and disposal capacity in its own country?

Pace of Disposal. In Canada, little incentive exists to phase out PCBs or to move PCBs out of storage. In the

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United States, no mandatory phaseout deadlines currently exist. In Mexico, PCB use is not banned, and storage and disposal are not tightly regulated, even as limited amounts of PCBs are exported overseas for disposal. In light of these situations, it is not clear that an open border policy alone would necessarily increase the pace of PCB disposal or that all available PCBs would actually be shipped across borders for disposal to existing facilities with available capacity.

Discussion Question. Under what conditions would the pace of PCB disposal increase, from a North American perspective? What other actions, such as a tax on PCBs remaining in use or in storage, would be necessary to enhance the pace of PCB disposal?

Available Capacity. Based on available information, it appears that existing disposal facilities have sufficient capacity to handle the PCBs remaining in use and in storage across North America. From a North American perspective, the capacity issue becomes one of supply for the volumes actually being disposed: How rapidly would PCBs move from use and storage to disposal under an open border policy and how would that change in volume moving to disposal affect the current excess capacity?

Discussion Question: Should a North American country be willing to accept — or encourage — PCB wastes from the others based on available capacity? How should any changes in volume that might shrink inordinately the "excess" capacity best be handled?

Locations of Disposal Facilities. The proposed changes to the U.S. import/export rules as written set up a system for "interest of the United States" to govern import decisions, whereas export is dependent on an international agreement and the ability of the receiving country to manage PCBs appropriately. Based on the current situation, the United States would be unlikely to export PCBs to Mexico because there are no facilities to dispose of PCBs in Mexico. The United States would not be able to export PCBs to Canada because the Alberta border is closed to non-Canadian wastes, and federal Chlorobiphenyl Regulations prohibit import. Thus, any waste flow between countries would be only one way, into the United States, if the U.S. alone opened its borders.

Discussion Question: Should any decision about an open border policy change in one country be made in consultation between the three governments to ensure that it served a shared North American PCB management goal?



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C. Role of an Open Border Policy

As described throughout this document, an open border policy is one of many policy tools that could potentially be used to achieve North American PCB management goals. However, the open border issue alone does not appear to be sufficient to lead to a sustained increase in the pace of PCB disposal, nor does it appear to be the only policy issue worthy of consideration in developing a shared North American PCB management strategy.

Any decisions to open the border should be made in light of the ability of an open border to enhance PCB management objectives, with an understanding that under an open border policy, there would likely be perceptions of "winners" and "losers." In the absence of new facilities, much, if not all of the remaining PCB disposal in North America would take place in the United States. Through regular market competition, some existing facilities, whether in the United States or Canada, may not maintain their current levels of business whereas others may see business increase. In addition, communities located near PCB disposal facilities may face higher levels of PCB activity as a result of an open border policy, though presumably not greater than the volumes originally permitted for each facility.

The following examples illustrate different ways that an open border policy could be structured if the three countries determined that some type of open border policy could enhance PCB management objectives.

- An unrestricted open border policy;
- An open border policy for a limited duration; and
- An open border policy with no time limits but with other restrictions such as:
  - Restrictions on the quantity of waste that could be imported or exported;
  - Imports only from countries that have developed their own capacity;
  - Imports only from countries that have no capacity.

An open border policy may need to be coupled with additional policies in the three countries to provide sufficient incentives for more rapid disposal to actually occur. For example, the following activities may help increase the effectiveness of an open border policy:

- Specific deadlines for removal and destruction in all three countries;
- Storage taxes; and/or
- Equal effort to inventory and ensure safe conditions for PCBs in use or in storage.

Transportation routes and the risks associated with PCB transport should also be studied if an open border policy were to be considered. If the United States border were open to PCB waste shipments, higher volumes of PCBs and PCB-contaminated equipment would be transported through the United States. This increased transportation activity would be weighed against the "unreasonable risk" test in TSCA, given the potential risk of spills. Because PCBs have been singled out for so much regulation, the public perception of risks associated with PCBs is likely higher than for other hazardous wastes, even as most transportation-related risk assessments show little risk from movement of

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waste when compared to other potential exposure pathways.

An open border policy will affect each country differently with regards to its ability — and incentives — to manage its own PCBs and its ability to build capacity within its own borders. The following questions illustrate the potential impact an open border policy could have on each of the three countries.

United States. Would an open border policy cause transcontinental PCBs to come to the United States at a rate fast enough to increase the price of PCB disposal for U.S. customers or to cause internal capacity problems? If the U.S. opens its borders, how should the rate of disposal of international PCBs be balanced with the destruction of U.S. domestic PCBs?

Canada. What would be the impact of an open border policy on existing and potential future disposal facilities in Canada? What set of circumstances, other than price, would cause Canadian PCB owners to not ship their wastes to the United States for disposal given the current disparity between U.S. and Canadian disposal prices?

Mexico. How would an open border policy affect the development of PCB disposal facilities in Mexico? Should an open border policy depend upon any other conditions if Mexico never develops any significant capacity?

Each country has a stake in the outcome of a country's decision on a border policy. Therefore, there is a need for the three countries to have specific discussions about a North American PCB management strategy. These discussions should focus on the need for, and desirability of, shared goals for PCB management, and the implications of any resulting strategy on each country's ability to provide proper PCB management and disposal incentives, if not facilities.



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IV. SUPPORTING A NORTH AMERICAN PCB MANAGEMENT STRATEGY

There are several opportunities to stimulate positive actions and, if appropriate, to support a North American PCB management strategy. Such a strategy should at least consider the desirability of having each country agree to an equivalency of performance for PCB management. That is, each country would agree to strive to accomplish the same management results, using their own, perhaps unique, management approaches. Such a goal does not imply that each country would necessarily have the same rules or the same management capacity; however, it would help unify the PCB management efforts in each country.

A logical approach is to bring the three countries together to focus specifically on the steps needed to establish a North American PCB management strategy. Two avenues for developing such a strategy are discussed below.

Policy Dialogue. A three-country policy dialogue could be established to help develop shared PCB management goals. Given that the United States' decision on its border policy will have potential ramifications for PCB management in each country, an informed discussion between the three countries will enable that decision to be made in light of their respective views of the strategy.

Technical Assistance. A mechanism for open information-sharing and technical assistance between the three countries could be installed. The nature of such assistance will vary between the three countries. Mexico has already requested assistance from the CEC regarding PCB management. There is an excellent opportunity to facilitate technical assistance and cooperation to help meet Mexico's identified needs, based on some of the experiences gleaned from the efforts of the United States and Canada to control PCBs in their countries. The specifics of such support would need to be developed carefully, and in conjunction with all three countries.

With this two part approach (a three-country policy dialogue and development of a technical assistance program) the CEC would fulfill two important components of its environmental mandate: (1) serving as a forum for discussion of environmental matters, and (2) promoting and facilitating cooperation between the parties with respect to environmental matters.

The information in this paper would then best be used to help focus the debate, rather than for the support of any specific policy recommendations. With an understanding of the key issues involved in developing a North American PCB management study, the CEC is well positioned to move forward with the objective of facilitation of a PCB management strategy for North America.



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COUNTRY PAPER

STATUS OF PCB MANAGEMENT IN CANADA

PREPARED FOR:

COMMISSION FOR ENVIRONMENTAL COOPERATION

PREPARED BY:

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SEPTEMBER 1995

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ACRONYMS AND TERMINOLOGY

Askarel	High PCB concentration electrical equipment fluid, generally containing between 40 to 80 percent PCBs.
ASWMC	Alberta Special Waste Management Corporation
CCME	Canadian Council of Ministers of the Environment
CCREM	Canadian Council of Resource and Environment Ministers
CEAA	Canadian Environmental Assessment Act
CEPA	Canadian Environmental Protection Act
Contaminated mineral oil	Low concentration PCB-contaminated transformer mineral oil fluid, generally containing less than 1 percent PCBs.
Decontamination	The removal of PCBs from a PCB solid, liquid or substance.
EPA	Environmental Protection Agency (U.S.)
LEAP	Londoners for the safe Elimination of All PCBs
MOE	Ontario Ministry of Environment
NRBC	Natural Resource Conservation Board (Alberta)
OECD	Organization for Economic Cooperation and Development
PCB	Polychlorinated biphenyl. Chlorobiphenyls are defined in the Canadian Environmental Protection Act as those chlorobiphenyls that have the molecular formula $C_{12}H_{10-n}Cl_n$, where n is greater than 2.
PCB equipment	Any manufactured item, including any transformer or capacitor, that contains a PCB liquid, PCB solid or PCB substance.
PCB liquid	Any liquid containing PCBs at a concentration of more than 50 milligrams per kilogram (50 ppm by weight) of the liquid (e.g. PCB-contaminated mineral oil, aqueous suspensions, and askarel).
PCB solid	A solid that contains more than 50 mg of PCB per kilogram of solid (50 ppm by weight).
PCB waste	Any PCB equipment, liquid, solid, or substance for which there is no longer any use.



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Phase out	The permanent removal from service and placement in storage of PCB equipment.
Reuse	Returning transformers to in-use service.
Recycling	Collection for subsequent smelting of transformer parts for metal recovery.
TDGA	Transportation off Dangerous Goods Act
TSCA	Toxic Substances Control Act (U.S.)



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1. INTRODUCTION

As part of the North American Agreement on Environmental Cooperation between the governments of Canada, Mexico and the United States (1994), the Commission for Environmental Cooperation (CEC) was established. The CEC recognizes the importance of encouraging the phase-out and destruction of hazardous substances. Polychlorinated biphenyls (PCBs) are recognized throughout North America as a hazardous substance and their proper disposal is mandated by law in the individual countries.

Although the three countries have differing regulations, inventories and infrastructure relating to PCBs, resources could be shared so as to realize more efficient PCB destruction. To investigate these opportunities for cooperation between the three countries, the CEC commissioned a study to be prepared jointly by three consulting firms, one from each country.

The CEC retained Proctor & Redfern to prepare this background report on the status of PCB management in Canada. Similarly, Ross & Associates Environmental Consulting Ltd. in the United States and ERM-México will prepare background reports on the status of PCB management in their respective countries. Ross & Associates is also responsible for coordinating the efforts of the three consulting firms and for producing the summary report that provides a North American perspective on PCB management.



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II. OVERVIEW OF THE CANADIAN PCB SITUATION

Although never produced in Canada, roughly 40,000 metric tonnes of high concentration liquid PCBs were imported into Canada from the United States (CCREM, 1986). Due to their low conductivity, PCB liquids have been primarily used as dielectric fluids in closed electrical equipment such as transformers and capacitors. Electrical uses account for approximately 70 percent of all PCBs used in Canada (CCREM, 1986).

PCBs have also been used in a variety of other industrial applications such as in plasticizers, heat transfer fluids, hydraulic fluids, vacuum pump and compressor fluids, and in the manufacture of inks, lubricants, flame retardants, special adhesives and carbonless paper. All of these can be considered partially or entirely open-ended uses that release PCBs to the environment (CEC, 1995).

In the mid-1970s, the Government of Canada, along with other developed countries, realized the potential environmental and human health concerns associated with exposure to PCBs. In 1976, under Canada's new Environmental Contaminants Act, this group of chemicals was investigated extensively by the Task Force on PCBs (Environment Canada, 1988). As indicators of its presence in the environment, the Task Force found significant levels of PCBs in herring gull eggs, fish, sediments, dairy food and human tissue.

Starting in 1977, the Government of Canada responded to these environmental and health concerns by passing a series of three Chlorobiphenyl Regulations. These banned the manufacture, sale and import of PCBs for any use, and specified the concentration and amount of PCBs that could legally be released to the environment.

In April 1985, a spill of PCB liquids occurred in northern Ontario near the community of Kenora. The spill, which contaminated the highway and passing automobiles, attracted considerable media and public attention. The "Kenora Incident" was one of the defining moments in the Canadian public's PCB awareness. Ironically, the federal government was just about to pass the Transportation of Dangerous Goods Act (TDGA) (July 1, 1985). Amendments were quickly passed to strengthen the PCB safety requirements, such as ensuring they are transported in leak-proof containers and that transformers are drained and properly secured.

Also in the early to mid-1980s, several provinces placed regulatory restrictions on PCB waste management activities such as handling, storage and disposal. In late 1985, the Ontario Ministry of Environment and Energy discovered that the only commercial PCB storage site in the province, located at Smithville (Figure 1), had serious PCB contamination problems. To date, C$35 million has been spent remediating this site.

In the late summer of 1988, a fire at a large commercial PCB storage site at St. Basile-le-Grand, Quebec (Figure 1) again focussed media and public attention on PCB issues. The federal government responded quickly to the event, passing an interim order for the proper storage of PCBs and announcing the Federal PCB Destruction Program. Starting in eastern Canada, this program was designed to establish a number of

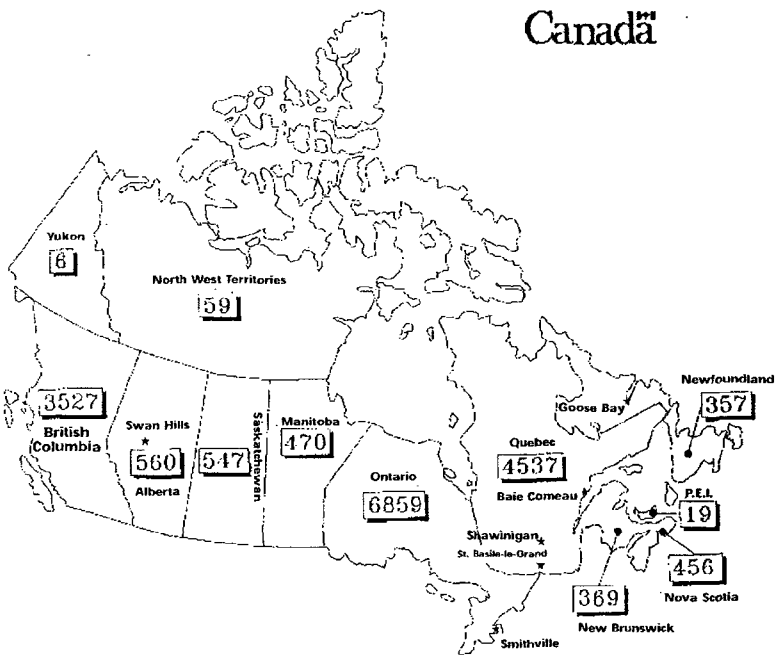


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temporary sites for the destruction of PCBs using mobile incineration technologies.

Although Canada moved relatively quickly to restrict the use of PCBs, it lacked PCB destruction facilities or a means to provide them. By the mid-1980s, low concentration PCB-contaminated mineral oil and its associated transformers were being successfully decontaminated using mobile chemical dechlorination technology. However, the destruction of high concentration PCB liquids (askarel) and the decontamination of associated electrical equipment was unavailable. High temperature incineration was, and still is, the only approved, commercially-used technology for the destruction of high concentration PCB liquids, and for the decontamination of other difficult-to-clean materials such as contaminated soils and concrete. Alternative technologies have still to prove their technical and/or commercial viability.

Figure 1: Distribution of Askarel Liquid (tonnes) Total In-use and In-Storage (as of December 1993)



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Provincial government and private efforts to locate permanent hazardous waste incineration facilities capable of destroying PCB wastes have met with considerable public opposition — except in Alberta where a permanent facility opened at Swan Hills in 1987. (Figure 1) Ontario's efforts, through the Ontario Waste Management Corporation, to site a permanent hazardous waste destruction/treatment facility near Smithville ended in failure in 1995 after 15 years of effort and the expenditure of over $140 million (Crittenden, 1995).

The proposed use of mobile PCB destruction facilities by the federal government (Federal PCB Destruction Program, 1988) was based, in part, on the view that temporary sites would be more acceptable to local communities.

The first site selected under this program was at Canadian Forces Base Goose Bay in Labrador (Figure 1). This was the location of a stockpile of approximately 2,500 metric tonnes of mainly PCB contaminated soil and electrical equipment. Another 1,000 metric tonnes of contaminated soil was shipped from two remote locations on the Labrador coast to Goose Bay for destruction. The proposed project successfully passed through the Federal Environmental Assessment and Review Process in mid-1989. Local public agreement for ridding the community of its PCB stockpiles was key to the success of the environmental assessment of the project and the project itself. Destruction of the PCB wastes using an American-owned, mobile, high temperature incineration facility was completed by mid-1990. Buoyed by these results, the federal government moved ahead with plans for similar programs in Atlantic Canada, Quebec and Ontario.

Meanwhile, in Ontario, the Ontario Ministry of Environment (MOE) had moved ahead with its plans for a mobile PCB incinerator for the destruction of 18,000 metric tonnes of mainly PCB contaminated soil, electrical equipment and askarel liquids at the former commercial PCB storage site at Smithville. Local support for the cleanup of the stockpiled PCBs was key to the favourable environmental review decision on this project. Once again, destruction of the stockpiled PCB wastes was completed in December 1992 using an American-owned, mobile, high temperature incineration facility.

Between 1991 and 1995, federal-provincial efforts were made to find another site for a mobile PCB destruction system in Atlantic Canada in addition to Goose Bay. They were unsuccessful due to strong opposition from the local communities near the two possible sites. Even though the nearest resident to one of the sites was over six kilometres away, the independent review committee rejected the proposal to destroy PCBs due to local public opposition. This was partially engendered by the lack of perceived benefits: for example, there were no local stockpiles of PCBs and there was a perceived social inequity to hosting the destruction of other communities' (and provinces') PCBs.

Federal efforts from 1990 to 1995 to work with a local citizens' group in London, Ontario to find an acceptable site for a mobile destruction system were also unsuccessful. The citizens group, Londoners for the safe Elimination of All PCBs (LEAP), worked hard trying to convince the residents of London about the merits of local PCB destruction. But, in the end,



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there remained strong local opposition to the sites under consideration.

In Quebec, the provincial government has proposed to destroy provincially-owned and some privately-owned PCBs using mobile destruction technology at multiple sites. Three sites have been selected in Quebec and passed the environmental assessment process in 1994. The destruction of PCBs was slated to start in late 1995.[1]

The Federal PCB Destruction Program officially ended in March 1995 with only the Goose Bay project accomplished. A major influence on ending this program may have been the recently announced opening of the Alberta border to other Canadian provinces for the destruction of hazardous wastes, including PCBs. This provides PCB owners in other Canadian jurisdictions access to the Swan Hills facility. In May 1995, the federal government proposed that federally-owned PCBs should be shipped to Swan Hills for destruction.

There has also been interest in opening the American border to the importation of Canadian PCB wastes. The United States closed its borders to the importation of PCBs in 1980. Canada passed a PCB Waste Export Regulation in 1992, which prohibits the export of PCBs from Canada except to the United States if the U.S. Environmental Protection Agency (EPA) agrees to their import. Prior to this, PCBs were shipped from Canada to two incineration facilities in Europe: Tredi in France, and Rechem in Wales.[2]

The EPA is currently reconsidering the importation ban. Several American PCB destruction and management firms, along with PCB owners groups in Canada, support the opening of the American border. Opposition includes the owners of the Swan Hills, Alberta facility and the Quebec firm (Cintec) that is scheduled to destroy the Quebec government PCBs. The costs of PCB destruction in the U.S. are generally less than at Swan Hills, and there is excess destruction capacity both in the U.S. and at Swan Hills.

[1] As of late May 1996, the electrical and mechanical testing of the destruction equipment was almost completed, and the destruction of PCBs is scheduled to begin shortly.

[2] The EPA's March 1996 PCB Import Rule no longer requires a regulatory exemption or case-by-case approval by the EPA for imports of PCBs in concentrations greater than 50 ppm, if certain conditions are met. However, the Canadian Minister of the Environment signed an Interim Order under CEPA to ban the export of PCB waste to the United States. The future of the Interim Order is uncertain.

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III. OVERVIEW OF REGULATORY REGIME

A. REGULATORY IMPETUS

Although PCBs have long been recognized as a potential occupational health concern in the context of industrial hygiene, their ubiquitous presence in the environment was not recognized until more sophisticated detection and analytical techniques and equipment were developed after World War II. In the course of investigating chlorinated pesticides such as DDT in the environment, scientists in Sweden and Great Britain also found traces of PCBs. Further worldwide investigations revealed that PCBs were present in both living and non-living systems from the equator to the Poles (MOE, 1984).

Unlike pesticides, there was no obvious pathway for PCBs to enter the environment in such a widespread manner except as a result of careless practices in the manufacture, use and disposal of PCBs.

In 1972, Monsanto, the only North American manufacturer of PCBs, voluntarily ceased marketing them in dispersive uses, e.g. in commercial products such as carbonless carbon paper, printing inks, sealants, paints, etc. The manufacture of PCBs for all other uses stopped in 1977.

One of the earliest catalysts for Canadian government action on PCBs was the Organization for Economic Cooperation and Development's (OECD's) decision of February 13, 1973. It recommended that member nations restrict the use of PCBs to dielectric fluids in transformers and capacitors, heat transfer equipment other than that used in food processing, hydraulic fluids in mining operations, and small capacitors. OECD further urged member nations to: provide a safe means for the disposal of surplus PCBs and PCB wastes; to establish a common labelling system; to develop safe means of transporting PCBs; and to limit their export (Environment Canada, 1988).

In response to the international recognition of the PCBs in the environment and the OECD decision, a Task Force on PCBs was established in Canada under the Environmental Contaminants Act in 1975. Its 1976 report described PCB residues in herring gull eggs (particularly those from Lake Ontario), fish, sediment, arctic mammals, human tissue and dairy food. Although higher concen-trations were found in the more industrialized portions of the country, PCBs were found across the country. This study and others prompted the federal government to take regulatory actions to control the use of PCBs (Chlorobiphenyl Regulations Nos. 1, 2 and 3).

This was followed in the 1980s by federal and provincial regulatory actions to control the handling, transportation, storage and destruction of PCB wastes. The impetus for these regulations was often well-publicized PCB accidents and events. These included:

- The "Kenora incident" spill of PCBs on the Trans-Canada Highway in Ontario, April 1985.
- The Smithville site, where extensive contamination of soil and groundwater from improper PCB storage was discovered in Ontario, 1985.
- The St. Basile-le-Grand fire at a PCB storage warehouse in Quebec, 1988.
- The rejection of a shipment of PCB wastes from the St. Basile-le-Grand fire clean-up at docks in Great



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Britain, their return to Canada and subsequent local protests over their storage at Baie Comeau, Quebec in 1989. (Figure 1)

The OECD also made a number of decisions and recommendations on the transboundary movement of hazardous wastes aimed at controlling waste exports with the objective of minimizing environmental damage.

This work on the export of hazardous waste by OECD and other international organizations culminated in the Global Convention on the Control of Transboundary Wastes, signed on March 22, 1989 (Saxe, 1991). Canada ratified this agreement known as the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (Basel Agreement) in August, 1992.

Canada passed its PCB Waste Export Regulations in July, 1990.

B. Federal Regulations

Overall protection of the Canadian environment is provided by the Canadian Environmental Protection Act (CEPA) of June, 1988. PCBs are listed under CEPA (Schedule 1) as a toxic substance. Under Sections 36 to 48, the Act specifies federal powers and owner responsibilities for toxic substances in general. A number of regulations under this Act deal with PCB management activities such as storage and import/export.

Introduction of a regulation to limit the use of PCBs was the first step towards controlling them in Canada. Starting in 1977, the federal government passed three Chlorobiphenyl Regulations under the Environmental Contaminants Act. These have since been reissued under the Canadian Environmental Protection Act as follows.

Chlorobiphenyl Regulations (SOR/91-152, February 21, 1991)

This regulation:

- Prohibits the use of PCBs in the operation of any product, machinery or equipment except in electrical transformers and capacitors, heat transfer equipment, hydraulic equipment, electromagnets and vapour diffusion pumps.
- Prohibits the manufacture of any product, machinery or equipment containing PCBs.
- Prohibits the importation of any product, machinery or equipment containing PCBs, except where the article is imported for destruction of the PCBs.
- Prohibits the use of PCBs as new filling or make-up fluids.
- Sets the regulated PCB concentration limit as equal to or greater than 50 ppm PCB by weight.
- Sets limits on the release of PCBs to the environment.

This regulation is currently under review for possible revision.

PCB Waste Export Regulations (SOR/90-453, July 27, 1990)

This regulation under CEPA bans the export of PCB wastes from Canada. An important exception is exports to the U.S. if the EPA agrees.

Storage of PCB Material Regulations (SOR/92-507, August 27, 1992)

Under the CEPA, this federal regulation governs the storage requirements for PCB wastes. It covers

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issues such as site selection, security, packaging, building features, stacking heights of pallets, fire protection, maintenance and security, labelling, record keeping and reporting requirements. Unless there is a federal-provincial agreement recognizing the equivalency of the provincial regulations, the federal storage regulations apply to all PCB owners. Some provinces also have PCB storage regulations and both levels of government work cooperatively to enforce them.

Transportation of Dangerous Goods Act (TDGA, January 27, 1985)

Under this act, the federal government is responsible for regulating all rail, marine and air shipments of dangerous goods and wastes, as well as the interprovincial and international road shipments of dangerous goods and waste. There are specific requirements for PCBs, including packaging specifications, manifesting, training and safety.

Federal Mobile PCB Treatment and Destruction Regulations (SOR/90-5, December 1989)

This regulation under CEPA applies only to mobile PCB treatment (chemical) or destruction (thermal) systems that are operated on federal lands, by a federal institution, or under contract to a federal institution.

The regulation contains solid, liquid and gaseous emissions standards, testing requirements, and reporting requirements.

Canadian Environmental Assessment Act (January 1995)

The Canadian Environmental Assessment Act (CEAA) came into force in January 1995 and replaces the Canadian Environment Assessment and Review Process guidelines. The Act applies to proposed projects where a federal authority proposes the project, provides financial assistance to the project, grants land to the project, or exercises a regulatory duty in relation to the project such as issuing a permit or licence.

There are different degrees of assessment required, from a relatively simple screening document to a comprehensive study.

C. Provincial Regulations

In general, provinces concentrate their PCB regulatory efforts on the management of PCB wastes, rather than in-use materials, particularly their handling, storage and disposal. Provinces also regulate the interprovincial road transportation of PCBs primarily using the same standards as required by the federal TDGA regulations. Some provinces, such as Ontario and Quebec, have additional regulatory requirements for transporting PCBs.

Although the interprovincial and international border movement of PCBs is regulated by the federal government, the provinces control the interprovincial and international movements of PCBs through the universal (federal and provincial) manifesting system, the provincial licensing of PCB road carriers, the provincial permitting requirements for PCB storage and destruction, and the notification and reporting requirements of several of these permits.



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D. Canadian Council of Ministers of the Environment (CCME) Guidelines

Originally called Canadian Council of Resource and Environment Ministers (CCREM), CCME is comprised of the Ministers of Environment from each province and the federal Minister of Environment. CCME has been active in the area of PCB management policy since the infamous 1985 PCB spill on the highway near Kenora, Ontario. In response to the spill, and to the national attention to PCBs that it generated, CCME established the following principal objectives:

- establish PCB destruction facilities;
- develop uniform national standards for the transportation, storage, handling and destruction of PCBs;
- develop national environmental quality objectives;
- develop a PCB phase-out strategy and improved spill prevention and contingency response capability; and
- develop and disseminate factual information on PCBs.

As a general observation, it appears CCME has been successful at accomplishing all its goals, except the establishment of PCB destruction facilities. Later, in its 1987 and 1989 PCB Phase-out strategies, CCME recognized that the lack of PCB destruction facilities was the biggest impediment to accelerated phase-out of PCBs, that is, at a pace greater than electrical equipment attrition.

CCME's 1989 phase-out strategy recommended:

- the legally-enforceable phase-out of all PCBs from sensitive locations, i.e. schools, hospitals, old-age homes and plants producing food, animal feed and water by September 1991;
- an accelerated pace for the phased-out of askarel equipment; and
- that all PCBs be phase-out by 1993, subject to PCB destruction capacity being available.

These recommendations have not been fully met. The federal government is currently working towards a 1996 deadline for the phase-out and destruction of all its federally owned PCBs.

In accomplishing its other objectives, CCME has published several PCB management manuals and guidelines. The more widely used are the *Manual for the Management of Waste Containing Polychlorinated Biphenyls (PCBs)*, February 1987, and its updated version, *Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls (PCBs)*, September 1989.



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E. Other Initiatives

There is also the joint federal-provincial PCB initiative by Canada and Ontario under *The Canada-Ontario Agreement Respecting The Great Lakes Basin Ecosystem, 1994*. One of its objectives is to decommission 90 percent of high-level PCBs in Ontario, to destroy 50 percent of high-level PCBs now in storage, and to accelerate the destruction of stored low-level PCB waste by the year 2000.

F. Environmental Effects

Although Canada has not made great progress in the destruction of PCBs, the benefits from the safe management of PCBs, as promoted by federal and provincial regulations and guidelines, have been noticed in the environment. The PCB levels in herring gull eggs in the Great Lakes Basin and in other sea birds on the Atlantic and Pacific coasts have declined dramatically since the early 1970s (Environment Canada, 1991).



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IV. PCB INVENTORIES

A. GENERAL

The 1976 report by the Federal Task Force on PCBs estimated the total imports to Canada up to 1974 as 15,775 metric tonnes. None were manufactured in Canada. Later reports issued by Environment Canada consistently use an estimated import tonnage of 40,000 metric tonnes of high concentration liquids, up to 1977. Only about 27,300 metric tonnes of these imports can be accounted for, which means the remainder (12,400 metric tonnes) has probably been released to the environment (Proctor & Redfern, 1995).

There is a joint federal-provincial responsibility in Canada to compile PCB inventory data. In general, Environment Canada tracks in-use PCBs, and federally owned PCBs; the provinces track other PCB wastes in storage. Since 1988, Environment Canada has been publishing annual PCB inventory reports, both in-use and in-storage.

B. SUMMARY OF INVENTORY

A summary of the Environment Canada (Environment Canada, 1994) nation-wide PCB inventory at year end 1993 is as follows:

In-use	
• Askarel liquids in-use (excluding fluorescent light ballasts)	11,500 metric tonnes
• Askarel equipment in-use (mainly transformers and capacitors)	24,905 metric tonnes (drained weight)
• Contaminated mineral oil in-use	2,161 metric tonnes
• Contaminated mineral oil transformers in-use	7,130 metric tonnes (drained weight)
In-storage	
• Askarel liquids in storage	6,265 metric tonnes
• Askarel equipment in storage (mainly transformers and capacitors)	8,982 metric tonnes (drained weight)
• Contaminated mineral oil in storage	3,787 metric tonnes
• Miscellaneous PCB wastes in storage, including: - 95,718 metric tonnes of soil - 6,328 metric tonnes of light ballasts - 1,582 metric tonnes of other drained equipment - 4,364 metric tonnes of miscellaneous waste	107,992 metric tonnes
Total PCB materials:	**172,722 metric tonnes**



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There are approximately 6,500 askarel transformers in use and 4,000 in storage. Askarel liquids found in transformers generally range from 40-80 percent PCBs. Higher concentration PCBs are found in capacitors and light ballasts. Contaminated mineral oil is generally contaminated at levels less than 0.1 percent (<1000 ppm) PCB. The liquids and their associated electrical equipment are reported as separate weights in this report even though, particularly in the case of the in-use category, the liquids are contained in the equipment. This separation in the inventory is in recognition that different treatment/destruction methods can frequently be used for liquids versus solids.

In-use fluorescent lamp ballasts are not inventoried. In 1985, Environment Canada estimated that there were 63 million in use. Since the life expectancy of the ballasts is approximately 15 years and new PCB ballasts have not been manufactured since 1979, it would seem reasonable to assume a significant portion have been taken out of service.

There were 3,216 PCB waste storage sites in Canada at the end of 1993.

These inventory statistics for the 1993 year-end are not expected to show any dramatic changes for 1994 and 1995, except for significant quantities of PCB waste sent to Alberta in 1994. This was from Manitoba (1,700 metric tonnes) and Saskatchewan for the testing of the new incinerator at Swan Hills, combined with a continued trend that saw askarel liquids and equipment moving from the in-use to in-storage category, as PCB owners continue to decommission this type of equipment. With few treatment/destruction options available in Canada for most PCB categories in the inventory (with the exception of contaminated mineral oil and associated transformers), the total of both in-use and in-storage tonnages should stay relatively constant through 1994 to 1995. The opening of Alberta's border, however, could impact these statistics in 1995.

Mobile facilities to chemically treat contaminated mineral oil and associated equipment have been very active in Canada since the mid-1980s.

C. Geographical Distribution of PCBs

Table 1 presents a detailed PCB inventory by province, subdivided into in-use and in-storage PCBs. Of most interest are the inventories of askarel liquids, askarel equipment and miscellaneous materials, since these materials are difficult to treat/destroy and there are few available options in Canada for this process.

Of all the PCB materials, askarel liquids present the greatest threat to the environment and human health due to their high concentration and liquid spill potential. Therefore, it is logical that these materials are a priority for destruction. The geographic distribution of askarel liquids by province is presented on Figure 1 (in-use and in-storage) (see page 36). The percentages of askarel liquid and equipment in use and in storage in Canada are approximately 70 percent and 30 percent respectively.



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Table 1 — PCB Distribution by Province (December 1993)
(All Units are Metric Tonnes)

	YK	NWT	BC	ALTA	SASK	MAN	ONT	PQ	NB	PEI	NS	NFLD	TOTAL
In-use													
Askarel liquids	1	30	1,343	409	309	260	4,806	3,795	148	10	160	229	11,500
[1]Askarel equipment (drained weight)	8	61	3,173	836	630	543	9,835	8,649	350	22	333	466	24,905
Mineral oil liquids	1	3	373	37	634	41	240	791	9	29	2	1	2,161
[2]Mineral oil transformers (drained weight)	3	10	1,230	122	2,092	135	792	2,610	30	96	7	3	7,130
												Total tonnes in-use:	45,696
In-storage													
Askarel liquids	5	29	2,184	151	237	210	2,053	742	221	9	296	128	6,265
[3]Askarel equipment (drained weight)	7	56	5,065	421	250	474	1,233	944	175	8	283	66	8,982
Mineral oil liquids	0.6	35	419	123	14	11	2,794	283	57	18	23	9	3,787
[4]Miscellaneous materials													
Soil	174	11	5,695	33	157	377	85,723	1,008	186	0	2,215	139	95,718
Drained equipment	7	3	74	198	43	18	53	600	283	11	206	86	1,582
Lamp ballasts	9	929	373	251	437	206	3,714	197	25	2	142	43	6,328
Other wastes	1	26	689	608	136	122	2,346	236	74	1	45	80	4,364
												Total tonnes in-storage:	127,026
												Total PCB materials:	**172,722**

Notes:

1. In-use askarel equipment tonnages are comprised mainly of transformers and capacitors with minor tonnages of miscellaneous equipment and lamp ballasts.
2. Environment Canada's PCB inventory only reports the weight of in-use mineral oil liquids and not the weight of the in-use transformer. To calculate the weight of the transformer casings, a factor of 3.3:1 transformer casing to mineral oil was used based on Environment Canada conversion factors.
3. In-storage askarel equipment mainly included transformers and capacitors with minor tonnages of other equipment. Lamp ballasts are reported under miscellaneous materials.
4. There are relatively minor tonnages of in-storage mineral-oil transformers; most of the oil is in bulk storage.

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V. PCB MANAGEMENT OPTIONS IN CANADA

Until the opening of the Alberta border in February 1995, there have been very limited, readily accessible PCB destruction/treatment options in Canada. For this reason, the storage of PCBs has been the most widely used management option. At the end of 1993, there were 3,216 registered PCB waste storage sites.

Canadian PCB management practices are discussed below.

A. STORAGE OF PCB WASTES

The storage of PCB wastes is regulated by the federal and provincial governments. Most storage is provided by the individual PCB owners for their own use. There are a few commercial contract storage sites but these are the exception rather than the rule. Many provinces discourage commercial storage.

Inspections of storage sites by federal or provincial regulatory inspectors take place on an annual basis. However, storage should not be look upon as a long-term solution to the PCB disposal problem. Over time, it is inevitable that storage sites and/or PCB containers will fall into disrepair and human vigilance will wane.

B. CONTAMINATED MINERAL OIL AND ASSOCIATED TRANSFORMERS

The treatment of low concentration PCB contaminated mineral oil and its associated transformers has been the only readily available, widely used PCB treatment technology in Canada. The treatment of the mineral oil is accomplished by mobile chemical dechlorination facilities, as well as a fixed facility in the provinces of Saskatchewan and British Columbia. Various mineral oil transformer decontamination methods are also widely used, including flushing with clean oil and for larger transformers, in-line treatment with a mobile dechlorination facility. Usually, the oil is treated to 2 ppm and transformers must pass a PCB test 90 days after treatment to ensure the PCB concentration in the oil has remained $\leq$ 50 ppm (e.g. a non-PCB transformer). Over the years, PCB owners have greatly reduced their inventories of contaminated mineral oil and transformers using these technologies. Companies currently offering mobile chemical dechlorination facilities are as follows. Only the head office address is listed, however, these services are provided across Canada.

Sanexen International
579 Le Breton Street
Longueuil, PQ J4G 1R9
Tel.: 514-646-7878
Fax: 514-646-5127

Rondar Inc.*
333 Centennial Parkway North
Hamilton, ON L7L 5R2
Tel.: 905-561-2808
Fax: 905-561-8871

* Rondar is licensed by ENSR Operations Ltd. (U.S.) to provide ENSR dechlorination services in Canada.

PPM Canada Inc.**
6 Chelsea Lane
Brampton, ON L6T 4Y4
Tel.: 905-790-7227
Fax: 905-790-7231

** PPM also operates a fixed facility in Regina, Saskatchewan.



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C. Askarel and Askarel Equipment

1. Askarel Liquids

With the exception of Ontario Hydro's recently approved chemical treatment system (see Section G), the only commercially approved technology in Canada for the destruction of askarel liquids has been high temperature incineration. The only permanent incineration facility in Canada is the Alberta Special Waste Management System at Swan Hills, Alberta (see Section E).

Askarel liquids have also been destroyed in Canada using mobile incineration equipment (see Section F). Other technologies for the destruction of askarel have been under development for several years but not, as yet, approved and available for commercial use (see Section G).

2. Askarel Equipment

The United States developed technology for the *in-situ* decontamination of askarel transformers for reuse is available in Canada. The transformers must be shut down and then drained of the askarel, which must be stored for eventual disposal, and refilled with a solvent. A processing unit is then attached to the transformer to circulate the solvent and remove the PCBs by distillation over a period of 12 to 24 months of in-service use. This is a relatively expensive process. It is used where the remaining service life of the transformer is significant and/or if the cost of removing the transformer from its installed location is prohibitive.

Two companies offer this service in Canada, as follows:

Westinghouse Canada Inc.
P.O. Box 2510
Hamilton, ON L8N 3K2
Tel.: 905-528-8811
Fax: 905-528-2959

Rondar Inc.*
333 Centennial Parkway North
Hamilton, ON L7L 5R2
Tel.: 905-561-2808
Fax: 905-561-8871

* Rondar provides the ENSR System 50 Process in Canada.

The decontamination of waste askarel equipment (transformers and capacitors) for scrapping and eventual metal recovery is available through the use of mobile equipment. A mobile, solvent extraction autoclave for the decontamination of disassembled transformers and capacitor metal parts is offered by Sanexen International through the "Decontaksolv" process.

Sanexen International
579 Le Breton Street
Longueuil, PQ J4G 1R9
Tel.: 514-646-7878
Fax: 514-646-5127

This mobile unit has been used in several provinces to reduce the volume of askarel electrical equipment in storage.

Askarel equipment can also be decontaminated using various types of incineration. The two mobile incineration projects are at Goose Bay and Smithville. Decontaminated shredded transformer and capacitor parts were treated with high temperatures first to



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remove, or vapourize, the PCBs from the metal surfaces and then to destroy them.

Although PCB light ballasts contain a small quantity of askarel liquid and some associated contaminated asphalt, 75 percent of the ballast, by weight, is non-PCB (Robertson, 1994). The federal government has undertaken demonstration trials for a process called ballast splitting, whereby non-PCB materials are separated from PCB materials. This results in only 25 percent of the original material requiring storage and eventual disposal as a PCB waste. A firm called PCB Containment Technology Inc. provided the process known as the Con Tech Reduction Process.

PCB Containment Technology Inc.
Unit 14, 110 Turnbull Court
Cambridge, ON N1T 1K6
Tel.: 519-622-8058
Fax: 519-622-8050

Significant tonnages of askarel equipment remain in use and in storage, presumably due to the significant costs of decontaminating this equipment using currently available facilities.

D. Other PCB Solids (Soils, Concrete, etc.)

Incineration has been used to decontaminate soils and other solids at Swan Hills, Alberta and at the two mobile PCB destruction projects. There is one landfill that accepts PCB contaminated soils, and it is located on the island of Montreal.

E. Alberta Special Waste Management Centre

In 1987 the Alberta Special Waste Management Corporation (ASWMC), a joint public and private venture, opened its hazardous waste treatment and disposal facility at Swan Hills, Alberta, approximately 250 km northwest of Edmonton. The facility was originally designed to treat only Alberta hazardous waste (Environment Canada, 1991). As such, the treatment system is fully integrated, starting with a collection system (transfer stations and road transport). The centre includes incinerators, a physical/chemical treatment plant, a stabilization plant, a secure landfill and a deep injection well.[3]

More recently the facility added increased incineration capacity and a transformer furnace, which accepts whole transformers for decontamination. From a financial standpoint, the increased capacity at the facility now makes it possible and desirable for the facility to accept hazardous wastes from outside Alberta. The facility is able to treat and destroy all types of PCB wastes, and is the only facility of its kind in Canada.

In 1993 Chem-Security Ltd. (operator of the ASWMC facility) applied to the Alberta Natural Resource Conservation Board (NRCB) to have the Alberta border opened for the import of hazardous waste (including PCBs) from the rest of Canada. Public hearings on this application took place in mid-1994. A favourable decision by NRCB was made in November 1994,

[3] Bovar Inc. is currently in negotiation to acquire the Province of Alberta's 40 percent interest in ASWMC.

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and provincial Cabinet approval (an Order in Council) was given in February 1995.

There are no regulations or policies to restrict the use of this facility by Canadian PCB owners. The Alberta border is not open to importation of PCBs from outside Canada. The new rotary kiln incineration equipment has a nominal capacity of 40,000 metric tonnes per year of solid hazardous waste (all types of waste are treatable) of which it is expected that 67 - 75 percent will be met by waste from outside the province of Alberta (D. Henderson, Chem-Security, personal communication, 1994).

F. Mobile Incineration

Mobile hazardous waste incinerators have been popular in the U.S. since the mid-1980s for the on-site cleanup of contaminated sites, particularly for the destruction of difficult to destroy chlorinated organic compounds such as PCBs.

Mobile incinerators that are owned and operated by American firms and are capable of safely destroying PCBs, come in a variety of sizes and configurations. The rotary kiln is the most popular type of incinerator because of its simplicity and ability to easily handle the variety of waste streams: liquids, solids and sludges. Other mobile system designs include an infrared furnace and a circulating bed combustion.

The capacity of this American equipment is usually stated in terms of tons/day (1 ton = 0.9078 metric tonnes) of solid material. Mobile incinerators range from 100 tons/day to over 500 tons/day. The small capacity units are usually considered the only truly "mobile" incinerators since they can be set up and running within a few weeks, whereas the larger units are considered "transportable" incinerators as they can take several months to set up on a site.

In Canada, mobile PCB incinerators have been widely proposed in the past by various governments (and private interests) to help solve the PCB disposal problem in Canada. In particular, the use of mobile incineration at multiple sites was proposed in 1988 by the federal government for the Federal PCB Destruction Program.

Despite the many mobile incineration projects proposed and planned by both private and public concerns, only two have been completed and a third is soon to be implemented. The two completed projects are:

- *Goose Bay PCB Destruction Project by the Department of National Defence at Canadian Forces Base Goose Bay, Labrador.* In 1990, it incinerated 3,500 metric tonnes of PCB materials including soils, shredded electrical equipment and liquids, using a modified mobile incinerator designed by Shirco, and an infrared incinerator owned and operated by OHM Remediation Services of Finlay, Ohio. Destruction costs were approximately $3,500/tonne; however, this high cost is in part a reflection of the remote location of the site.

- *Smithville Site PCB Incineration Project by the Ontario Ministry of Environment and Energy at Smithville, Ontario.* In 1991 to 1992, it destroyed 18,000 metric tonnes of PCB materials including soils,

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shredded electrical equipment and liquids, using a mobile rotary kiln owned and operated by Ensco Inc. of Little Rock, Arkansas. Destruction costs were approximately $1,200/tonne.

The third project is about to be implemented by the Quebec Ministry of Environment at three sites in the province of Quebec; Manicouagan (near Baie Comeau), Shawinigan (Figure 1) and St. Basile-le-Grand, to destroy or treat approximately 18,000 metric tonnes of PCB wastes. The contractor is Cintec Environnement inc. of Montreal. It plans to use a circulating bed combustion incinerator purchased from Ogden Environmental to destroy PCBs, and the Sanexen Decontaksolv process to decontaminate electrical equipment.

Two additional trial demonstration burns of PCBs using mobile incinerators have also taken place in Canada. One, in Swan Hills, Alberta, used the Vesta 100 rotary kiln. The other, at Manicouagan, Quebec used the Vesta 200 rotary kiln. Both kilns are owned and operated by Vesta Technology Ltd. of Fort Lauderdale, Florida.

G. New Technologies for the Canadian Market

ELI EcoLogic of Rockwood, Ontario has developed a hazardous waste thermal chemical destruction unit capable of destroying PCBs and decontaminating solids. The company plans to test its newly constructed, commercial size unit (100 metric tonnes/day) in Ontario this year. Destruction costs have been estimated by the firm at $400/tonne.

Safety-Kleen of Breslau, Ontario has developed a thermal-chemical reduction process for the dechlorination of PCBs. Safety-Kleen has made application to the MOE for approval to destroy PCBs at their Breslau used-oil recycling facility. A decision on their application is pending from the Environmental Assessment Board.

For several years, Ontario Hydro has been developing a chemical destruction method for askarel liquids, which distills the chlorobenzenes from the askarel leaving behind almost pure PCBs that are then chemically treated. A prototype commercial unit has been built, and a Class 2 (chemical destruction) Certificate of Approval has been granted for the system by the Ontario MOE.

According to Ontario Hydro, the prices for treatment are expected to be similar to those at the Swan Hills, Alberta facility. Ontario Hydro is seeking a private partner to commercialize the treatment service.

There has also been interest by the American transformer maintenance firm S.D. Myers in developing a chemical destruction technology for the Canadian market.



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VI. BARRIERS TO PCB DISPOSAL

A. BACKGROUND TO THE SITUATION

Canada has approximately 36,000 metric tonnes of askarel liquids and askarel equipment in use, and approximately 122,000 metric tonnes of mainly askarel liquids, askarel equipment and contaminated soil in storage. These are all types of PCB materials that are difficult and expensive to destroy or decontaminate. Other than a few notable examples, little progress has been made in disposing of these inventories.

As in the U.S., high temperature incineration has been sought to deal with the many of these materials. However, in Canada there has been great difficulty in implementing either fixed or mobile incineration facilities. This is primarily due to public opposition to hazardous waste incineration despite very comprehensive and expensive public consultation efforts. Only in Alberta was the siting for a fixed facility successful. The Alberta siting process was voluntary with economic incentives. The Ontario Waste Management Corporation spent more than $140 million over 15 years unsuccessfully trying to site a permanent facility in southern Ontario.

The two successful mobile incineration projects (Goose Bay and Smithville) and the proposed Quebec mobile incineration project all have large quantities of PCBs stored in or near the site communities. This is the factor that provides the needed incentive for communities to agree to these temporary projects. Due to their temporary nature and relatively small size, mobile incineration projects cannot provide the long-term, larger-scale financial benefits to host communities that can be provided by permanent facilities.

This lack of community incentive became apparent in the recent failure to secure a site for the Atlantic Canada PCB Destruction Program. The communities surrounding the two sites under consideration were strongly opposed to the project. Neither site had significant inventories of PCBs nearby and thus believed "that they would be put at risk to benefit others throughout the region" (IRC, 1994).

B. FUTURE PROSPECTS

The recent opening of the Alberta border to allow PCBs from other Canadian jurisdictions access to the Swan Hills facility is a move welcomed by PCB owners and Canadian governments. However, the Swan Hills facility is looking to out-of-province PCB owners to make the facility profitable by increasing throughput. When transportation costs are added to the costs at Swan Hills, PCB owners in eastern Canada may find it too expensive to encourage significant progress in PCB destruction. New mobile technologies such as the EcoLogic Process and Ontario Hydro's chemical treatment for askarel have yet to prove their cost competitiveness.

Under the U.S. Toxic Substances Control Act (TSCA), imports of PCBs into the U.S. are prohibited. However, exemptions may be granted by a petition approval process, granted for one year with opportunities for renewal. The importer must prove that the PCBs constitute no unreasonable risk and demonstrate good faith in efforts to develop a substitute.



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Starting in 1991, the U.S. Environmental Protection Agency (EPA) has received a number of petitions for exemptions. S.D. Myers Inc. of Talmadge, Ohio submitted petitions to import and dispose of all of Canada's askarel liquids and askarel equipment (trans-formers, capacitors and light ballasts). In total, S.D. Myers estimated that it would generate US $321 million in revenue. The EPA is proposing to deny the S.D. Myers' petitions "...because Myers has failed to demonstrate that the risks of the proposed activity are reasonable when weighed against the benefits...". The EPA states that Myers has failed to substantiate its claim that the United States would benefit environmentally from the removal of PCBs stored in Canada. In addition, the EPA contends that Myers failed to prove that establishing a facility in Canada is not feasible and, more importantly, that Canada has a domestic disposal facility at Swan Hills and is in the process of expanding its PCB disposal resources, i.e. Cintec Environnement inc.'s acquisition of Ogden Environmental's mobile incinerator for use in Quebec.

The EPA is considering proposed rule changes to its PCB legislation, some of which are related to the import and export of PCBs. The EPA issued its proposed rule changes in December 1994.

The EPA proposes exemptions to the import ban under a two-prong test: where imports are in the interests of the United States and will not result in unreasonable risks to health or the environment. Under the proposed rule, imports for disposal would be allowed on a case-by-case basis and could occur without the petition process at the EPA's initiative, or in response to a petition.

In the proposed disposal rules, the EPA has invited comments on the issue of the transboundary movement of PCBs in general. The EPA requested comments on the circumstances under which the U.S. border should be open to PCB importation. The comment period closed in May 1995.

The EPA has received comments on the proposed PCB disposal rules. Canadian comments include those both from PCB owners groups and management firms. In summary, the letters from PCB owners in Quebec and Ontario appear to be in favour of opening the American border. The letter from Cintec Environnement inc. of Montreal, a PCB management firm with mobile incineration capability, is against the border opening. Representatives of the Swan Hills, Alberta facility have made presentations to the EPA against the border opening.

Although each side in the border issue makes numerous arguments supporting its position, the Canadian PCB owners appear to want the border open mainly to provide more PCB disposal options and thus a more cost-competitive marketplace. Canadian PCB management firms want the border to remain closed to protect their investments which were made based on the closed border.



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COUNTRY PAPER

STATUS OF PCB MANAGEMENT IN MEXICO

PREPARED FOR:

COMMISSION FOR ENVIRONMENTAL COOPERATION

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ERM-MÉXICO, S.A. DE C.V.

AUGUST 1995

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ACRONYMS

CFE	*Comisión Federal de Electricidad* (Federal Electricity Commission)
CLFC	*Comisión de Luz y Fuerza del Centro* (Central Light and Power Commission)
CRETFB	Corrosive, Reactive, Explosive, Toxic, Flammable, Biologic
D.O.	*Diario Oficial*
EPA	U.S. Environmental Protection Agency
INE	*Instituto Nacional de Ecología* (National Institute of Ecology)
INEGI	*Instituto Nacional de Estadística, Geografía e Informática* (National Institute of Statistics, Geography and Informatics)
KVA	Kilowatt amperage
LGEEPA	*Ley General del Equilibrio Ecológica y la Protección al Ambiente* (General Law for Ecological Equilibrium and Environmental Protection)
OECD	Organization for Economic Cooperation and Development
PCBs	Polychlorinated biphenyls
PEMEX	*Petróleos Mexicanos* (National Oil Company)
PRI	*Partido Revolucionario Institucional* (Institutional Revolutionary Party)
Profepa	*Procuraduría Federal para la Protección del Ambiente* (Federal Environmental Attorney General), Mexico
SCT	*Secretaría de Comunicaciones y Transportes* (Secretariat of Communications and Transport)
SEDUE	*Secretaría de Desarrollo Urbano y Ecología*, Secretariat of Urban Development and Ecology
SEMARNAP	*Secretaría del Medio Ambiente, Recursos Naturales y Pesca* (Secretariat for the Environment, Natural Resources and Fisheries)
STC	*Sistema de Transporte Colectivo* (Mexico City Subway Authority) (also known as the *Metro*)

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I. INTRODUCTION

Polychlorinated biphenyls (PCBs) are a group of chlorinated compounds which were initially synthesized in 1864, although their commercial production began in 1929. Because of their thermal, chemical, and biological stability and their high dielectric value, PCBs were considered efficient for use as insulating fluids in equipment such as transformers, capacitors, ballasts, and heat exchangers. Given their anti-inflammable properties, most dielectric oils with PCBs were utilized in areas with significant fire risk, as in industrial plants, public transportation systems (*Sistema de Transporte Colectivo (STC)*, Mexico City Subway Authority or *Metro*), and *Petróleos Mexicanos (PEMEX)*, National Oil Company, petrochemical plants.

Overall, between 1929 and 1977, 1,200,000 metric tonnes of PCBs were produced. In 1977, the commercial production of these chemicals was banned in the United States. But before the ban, the U.S. had generated a total of 635,000 metric tonnes, the main source of the PCBs now in Mexico. East Germany also produced large amounts of PCBs (between 206,000 and 300,000 metric tonnes). Other producers of PCBs included Japan, France, the United Kingdom, the former Republic of Czechoslovakia, Italy, and Spain (IEMPOP, 1993).

Most of the PCBs present in Mexico were manufactured by the Monsanto Chemical Co. in its plants in Alabama (closed in 1970), and Sauget, Illinois (closed in 1977). The rest were produced in Europe and Japan, and were being imported by Mexico even during the 1980s since such shipments were not yet banned. It is estimated that Mexico imported about 10,000 metric tonnes of liquid PCBs from the United States and other producer countries. This quantity, despite being a significant amount, is much less than the amount of liquid PCBs in Canada or in the United States.

PCBs are stable chemicals and bioaccumulate. Ingestion or exposure to PCBs can cause a number of adverse effects in humans, with newborn children being the most vulnerable. Some types of PCBs (i.e., coplanar PCBs) are more toxic than others. No detailed information of the location and volume of PCBs present in Mexico is available by type.

Aware of the risk that PCBs represented for human health and the environment, during the 1980s the former *Secretaría de Desarrollo Urbano y Ecología (SEDUE)*, Secretariat for Urban Development and Ecology, directed the then *Subsecretaría de Ecología*, Subsecretariat of Ecology, to prepare an initial inventory of PCBs and search for feasible PCB elimination methods.

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II. PCB LEGISLATION AND POLICIES

The fundamental environmental law in Mexico is the *Ley General del Equilibrio Ecológica y la Protección al Ambiente (LGEEPA)*, General Law of Ecological Equilibrium and Environmental Protection. Sections relating to PCB management are found in the *Reglamento en Materia de Residuos Peligrosos*, Hazardous Wastes Regulations.

PCBs, or any material containing PCBs in concentrations higher than 50 ppm, are considered hazardous products or wastes, according to the official Mexican standard NOM-CRP-001 of the *Diario Oficial (D.O.)*, 22 October 1993. Thus the legal obligations relating to hazardous wastes are also applicable to PCBs, these having the code CRETIB: (toxic) and No. INE RPNE1.1/04 (*Diario Oficial*, 22 October 1993). This includes all environmental, health, safety, and transportation standards applicable to hazardous wastes. In Mexico, from the legal, regulatory, and political points of view, administrative control over their management is beginning to be successful.

The Hazardous Wastes Regulations, published in the *Diario Oficial* on 25 November 1988, contain four articles especially relevant to PCBs: Articles 7, 8, 38 and 39.

Article 7:

> Those intending to execute public or private works and activities by which hazardous wastes might be generated or handled, must have the authorization of the Secretariat, under the terms of Articles 28 and 29 of this Law.
>
> In the corresponding *Manifestación de Impacto Ambiental*, Environmental Impact Assessment, the hazardous wastes to be generated or handled in the work or activity, as well as their amounts, must be specified.

Article 8:

Producers of hazardous wastes must:

I. Register their activities in the record that has been established by the Secretariat for such purposes.

II. Maintain a monthly log of hazardous waste production.

III. Submit hazardous wastes to handling procedures specified by the regulations and relevant ecological technical standards.

IV. Handle incompatible hazardous wastes separately under the terms of the corresponding ecological technical standards.

V. Store hazardous wastes in containers which fulfill the safety conditions specified by these regulations and by the corresponding ecological technical standards.

VI. Identify hazardous wastes with labels specified by these regulations and by the corresponding ecological technical standards.

VII. Store hazardous wastes in safe conditions and areas that fulfill the requirements specified by these regulations and by the appropriate ecological technical standards.

VIII. Transport hazardous wastes in vehicles specified by the

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Secretaría de Comunicaciones y Transportes (SCT), Secretariat of Communications and Transport, and under the conditions specified by these regulations and by the corresponding ecological technical standards.

IX. Submit hazardous wastes to appropriate treatment, according to the specifications of the regulations and the respective ecological technical standards.

X. Subject hazardous wastes to appropriate disposal techniques, according to methods specified by the regulations and the applicable ecological technical standards.

XI. Submit to the Secretariat, in the specified format, a semi-annual report of the movements of hazardous wastes during such period.

XII. [Abide by] any other relevant provisions of the regulations and other applicable laws.

Article 38:

Polychlorinated biphenyls must be handled in accordance with what is required in these regulations, and with the ecological technical standards that are issued for this purpose.

Article 39:

Final disposal of polychlorinated biphenyls, or of any other wastes containing them, is prohibited in confined conditions, and in any other places [with the following exceptions:]

I. Chemical catalysts, in the case of wastes with low PCB concentrations.

II. Incineration, for wastes of any concentration (*Diario Oficial*, 25 November 1988).

By decree, on 28 December 1994, the new Secretariat for the Environment, Natural Resources and Fisheries, *Secretaría del Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP)*, was created. *SEMARNAP* is now responsible for environmental protection in Mexico, and is analogous to the Environmental Protection Agency (EPA) of the United States and Environment Canada in Canada.

The *Comisión Federal de Electricidad (CFE)*, Federal Electricity Commission, has published a number of manuals of technical information on the safe handling of PCBs which in practice have become the basic guidelines on this subject. The most important is the *Instructivo para el Manejo Preventivo de los BPCs* , Instructions for the Preventive Management of PCBs, of May 1988. This document is divided into five chapters, addressing the following issues:

1. general and physical characteristics;
2. handling of equipment and material containing PCBs;
3. storage;
4. confinement areas; and
5. transportation.

It also discusses other issues, including maintenance of items containing

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PCBs, labels, waste treatment, accidents, what to do in case of fire, prevention, and PCB substitutes and replacements.

According to the *Gaceta Ecológica*, No. 11 (XI-90), any entity that handles PCBs and will eventually need to dispose of them, must register with the Instituto Nacional Ecología (*INE*), National Institute of Ecology, using a special report form for the occasional generation/handling of PCBs, the *Formato de manifestación para empresas generadoras eventuales de BPCs*. (See Appendix 1). The purpose of this form is to make those companies having equipment containing, or contaminated by, PCBs aware of the appropriate procedures for PCB handling and destruction (*INE*, 1993). However, the form is not widely known by the companies and industries who should file it. The fact that it is obligatory has not been adequately publicized and the requirement for filing it has not been enforced. In the past, PCB management did not have a high priority and did not receive much attention, thus increasing potential impacts on human health and the environment.

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III. INVENTORY AND LOCATION OF PCBs

A. PCB INVENTORY METHODOLOGY

For this report, the PCB inventory for Mexico was estimated by two different methods:

a) Gathering **available information** from several well-documented sources.

b) Using a verification method by which the approximate amount of PCBs was calculated by **emission factors**, according to the best engineering practices.

These methods are discussed in the following sections.

1. Available Information

a) There is no official inventory of PCB amounts and characteristics in Mexico, although *Instituto Nacional de Ecología (INE)*, National Institute of Ecology, is in the process of conducting a national inventory. However, it is estimated that there are about 8,000 metric tonnes of PCBs as liquid and contained in transformers.

b) There is no information on the amount of PCB-contaminated material.

c) There are no authorized facilities for the incineration of PCBs in Mexico. However, there is one authorized mobile unit for the decontamination of mineral oils containing PCBs in low concentrations.

d) The main owners/operators of PCBs in Mexico are:

- *Comisión Federal de Electricidad (CFE)*, the Federal Electricity Commission;
- *Petróleos Mexicanos (PEMEX)*, the National Oil Company;
- the public transportation system (the "Metro");
- *Compañía de Luz y Fuerza del Centro (LyF)*, the Central Light and Power Company; and
- private industries.

e) There is only one transfer station authorized for the temporary storage of PCBs, located in El Salto, Jalisco.

f) Mexican legislation bans the final disposal of PCBs in landfills.[1]

PCBs in Mexico have been mainly used in transformers, capacitors and fluorescent light ballasts. Any inventory of PCBs should consider the volume of the liquid oils, as well as the equipment which contained them, and the material and soils which have been contaminated. On the other hand, inventory methods should differentiate between the total volume that has been imported, and the current total volume. This is important because a portion of the dielectric oils containing PCBs has already entered the environment or been burnt, and is thus neither recoverable nor quantifiable.

[1] In early March 1996, *Instituto Nacional de Ecología (INE)* authorized one company (RIMSA) to landfill drained transformers with PCB concentrations under 500 ppm.

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The estimate of the total amount of PCBs that has been imported into Mexico varies, ranging between 6,000 and 20,000 metric tonnes.

The total amount of solid materials contaminated with PCBs could be up to five times the volume of liquid PCBs, based on ERM-México's estimate of the amount of electric equipment in contact with PCBs and on the limited permeability of PCBs into the ground. Therefore, the maximum probable amount of liquid PCBs is about 10,000 metric tonnes, the amount of electric equipment and materials contaminated with PCBs could be on the order of 50,000 metric tonnes. This would be consistent with the Canadian and U.S. estimates.

A representative example of the lack of detailed information on the amount of PCBs is the case of *Petróleos Mexicanos (PEMEX)*. *PEMEX's* published official PCB inventory indicates the existence of 73 metric tonnes of insulating oils containing PCBs, including the wastes in the former refinery at Atzcapotzalco (Environmental Management, *PEMEX*, 1992). ERM-México has experience with private companies which operated through the 1930s, 40s, and 50s with fewer than ten transformers and suffered the typical number of spills throughout this period. These companies averaged 50 to 250 metric tonnes of PCBs per industrial plant, including both liquid PCBs and contaminated materials. Therefore, it seems unlikely that over a span of more than 50 years in all, the installations of the largest company in Mexico, *PEMEX*, could have amassed only 73 metric tonnes of oils and wastes, an amount usually equivalent to that generated by a single medium-sized company.

Based on the latest available information, the *Comisión Federal de Electricidad (CFE)* has approximately 1,870 metric tonnes of PCBs. Dielectric oils and PCBs can be found in Mexico wherever an electric power distribution network is located, in particular, in the large generating plants and substations. PCBs are especially likely in the transformers, capacitors, and ballasts that were in use before the 1980s — the probability being higher if the electric equipment was installed in places where there was a risk of fire (*SEDUE*, 1988).

The amount of electric power consumption in large industrial plants implies the probable existence of substations of significant size. Based on the experience of many years of environmental auditing of companies in Mexico, ERM-México has estimated that among the more than 50,000 companies existing in 1980, the 2,000 largest had five capacitors each. Thus, there may be about 10,000 transformers or capacitors overall. It is therefore very probable that a sizeable number of private companies throughout Mexico have accumulated significant amounts of PCBs, with possible PCB contamination resulting in the industrial complexes.

2. Emission Factors

When a proportional relationship is assumed between the amount of PCBs remaining and the installed electricity generation capacity, the potential quantity of PCBs in Mexico may be estimated. According to the *Monthly Statistics Bulletin of the United Nations* of May 1992, Mexico generates 120 million kW/h. The United States, on the other hand, generates 3,000 million kW/h, 25 times as much as

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Mexico; and Canada, 480 million kW/h, four times as much as Mexico.

The U.S. Environmental Protection Agency (EPA) estimates that 340,000 metric tonnes of PCBs remain in equipment in the U.S., and that 26 million cubic metres of soil are contaminated with PCBs. Environment Canada estimates that 46,000 metric tonnes of PCBs remain in equipment, and that 127,000 metric tonnes of PCBs, PCB-contaminated materials, and contaminated soil remain in storage.

Table 1 compares the electric power generation capacity in all three countries to give a rough approximation of the quantity of PCBs and PCB-contaminated materials that may remain in Mexico.

Table 1: Comparison of Electrical Power Generation Capacity

United States	Emission Factor	Estimate for Mexico
340,000 metric tonnes in equipment	25	13,600 metric tonnes in equipment
26 million cubic metres of contaminated soil	25	1 million cubic metres of contaminated soil

Canada	Emission Factor	Estimate for Mexico
46,000 metric tonnes in use	4	11,500 metric tonnes in use
127,000 metric tonnes in storage	4	32,000 metric tonnes in storage

These figures are comparable to the estimates obtained from available information.

A top official of one of the main electrical equipment companies that manufactures transformers has said that between 1950 and 1980, approximately 4,000 transformers were constructed, each of them weighing about 1 metric tonne and containing, on average, 1 metric tonne of liquid PCBs. This implies the existence of some 8,000 metric tonnes of liquid PCBs and contaminated materials, generated by only one transformer manufacturing plant.

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B. Distribution of PCBs and Case Studies

PCBs are distributed throughout Mexico, but particularly in:

- electric power generation; installations;
- substations;
- industrial complexes;
- water wells (pumps); and
- urban zones.

In the past, the *Comisión Federal de Electricidad (CFE)*, Federal Electricity Commission, has assessed the regional distribution of its own PCBs. See Table 2 for the results.

The regional distribution of *CFE*-owned PCBs shows that the central region contains five times more PCBs than the northern or southern regions. This is because the central portion of the country contains the largest cities and the largest electrical installations. The systems interconnecting PCBs in electric power networks are the transformer and capacitor networks. Places of particular interest where PCBs may be found are concentrated in the main consumption centers, which in Mexico are located along two main axes: an axis North — South, and another Northwest — Southeast. In addition, thousands of smaller sites are distributed throughout the country (see Map 1, Appendix 3).

The fact that hydroelectric power generation facilities are located close to waterfalls for the turbines has contributed to PCBs entering surface waters. As a result of leaks and the abandonment of hydroelectric plants, ERM-México believes that bodies of water will be found to have been significantly impacted by PCBs.

Table 2: Regional Distribution of CFE-owned PCBs in Mexico

	In Use	Out of Use	Total
Region	**(metric tonnes)**	**(metric tonnes)**	**(metric tonnes)**
North	323	86	409
Central	1600	345	1945
South	280	75	355
		Grand Total:	2709

Source: *Secretaría de Desarrollo Urbano y Ecología (SEDUE)*, 1988.
[Original data given in litres, converted to metric tonnes using density = 1.45]

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ERM-México made a series of field visits to diverse substations and industrial companies in different areas of the country to evaluate the accuracy of the verification method for this survey, as well as to understand actual field management and handling practices for PCBs.

1. Transformer Repair in Mexico

A subject of concern is the existence of transformer repair workshops, many of which have been operating for decades, and which continue to be an important source of environmental damage. These facilities lack any sort of special permit for the handling of PCBs, and most of them do not have adequate handling systems. Any transformer is accepted, regardless of PCB content.

An example is a transformer repair shop located in the arid zone of the State of Nuevo León in a small ravine which is sometimes flooded. At the time of the visit by ERM-México, the installation contained about 50 transformers and 30 drums stored outdoors without labels or spill controls, even though leaking was evident. The transformers, some of which could have contained PCB-dielectric oils based on their age, did not have protection against weather or trespassing. The shop lacked an oil disposal facility and the disposal location for the waste transformers and oil could not be ascertained.

2. Substation in Chihuahua

ERM-México visited a two-transformer substation located in a residential zone in Chihuahua. Several unidentified tanks containing oils were seen, along with severe leakage into the ground. The perforated retaining wall of the containing pit indicated inadequate handling practices for any hazardous industrial wastes on the site, whether they contained PCBs or not. Even when the substation spilled significant amounts of an oily liquid onto the street, nobody was able to provide information regarding the possible presence of PCBs in the oil.

3. Substation in Tamaulipas

This substation, with a capacity of 25.2 mW, is in a urban zone near two schools, a church, and a childrens hospital. A large number of oil drums were seen on the site, many with leaks, although it could not be ascertained if these oils contained PCBs. A *Comisión Federal de Electricidad (CFE)* repair and storage workshop and several offices are located in this complex. Many transformers were also visible from outside the perimeter. Behind the installation, a considerable amount of electrical equipment, including used transformers, is stored outdoors on the ground.

4. Substation in the State of Mexico

This substation, located in the Lerma River basin, has been in operation for more than 30 years. It has a storm water collection system that drains to a storage tank from which waste dielectric oil and water are pumped for discharge into the Lerma River, the principal source of drinking water for the city of Guadalajara. At the substation the personnel did not have any specific information regarding the potential presence of PCBs on-site.

The substation stores dielectric oils in horizontal tanks that have a total capacity of about fifty-eight metric

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tonnes. These tanks have leaked into the ground and the oil has passed under a wire fence to a sewer that discharges into the Lerma River. The operators have been warned of the risk of electrical discharges, but not of the potential hazards caused by discharges of dielectric oil which may contain PCBs.

5. Thermoelectric Plant in Chihuahua

A thermoelectric power generation plant located in a residential zone of Chihuahua was operated, according to the information provided by its neighbors, for many decades until it was shut down in 1985. The installation, with open access from the street, contains transformers and other electrical equipment. It is near residential neighborhoods and a school. Leaks from some of the electrical equipment onto the ground around the substation were evident, although the presence of PCBs could not be verified.

6. Hydroelectric Plants near Valle de Bravo

During the 1950s, as a part of the Miguel Alemán Hydroelectric Project, a series of power generating installations were constructed in the State of Mexico, including the Héctor Martínez de Meza Hydroelectric Plant, inaugurated on 10 August 1956. The plant was abandoned during the 1980s, and is now completely open to trespasses by the public. It contains three large Swiss-made transformers which leak oil onto the ground and into the sewage system that discharges into the Valle de Bravo lake, a source of drinking water for Mexico City.

At another facility close to the Valle de Bravo lake, the San Gaspar Hydroelectric Plant, dozens of drums containing used transformer oil had been stored outside on a concrete platform until *Procuraduría Federal para la Protección del Ambiente (Profepa)*, the Federal Environmental Attorney General, arranged their transport to a safe storage facility. Operators at these hydroelectric plants informed ERM-México that during the 1960s, a canvas container of dielectric fluid was accidentally punctured by a metal rod, causing a spill that infiltrated the ground.

7. Storage Center in the Central Division of the *Comisión Federal de Electricidad (CFE)*

The *CFE* storage warehouse occupies about two hectares of formerly agricultural land. At the time of the ERM-México visit, the building contained about 450 transformers and 200 drums, among other equipment related to electrical power. There was a temporary storage area especially for liquid PCBs in 200-litre drums which covers about 60 square metres and is roofed. It is identified with a sign reading "DANGER, PCBs," and is kept closed. ERM-México was informed that approximately 50 drums were stored there at that moment.

Outdoors, transformers were stored on the ground with no protection or identification. Various of the stored units were noted to be leaking. Some, considering their age, may have contained PCBs. Workers interviewed knew about the toxicity of PCBs, but had not received any formal training about the chemicals.



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8. Storage Center in the Northern Division of the *Comisión Federal de Electricidad (CFE)*

In a storage center for the *CFE* Northern Division there are hundreds of transformers of all sizes, stored outdoors. At the time of the ERM-México visit there were no labels indicating PCB contents, and the fluorescent yellow labels that should explain the reason why the equipment was removed were not filled in. Obvious leaks onto the concrete and into sewers were seen. The workers claimed not to know of any permanent PCB storage or destruction sites, but were aware that the PCBs were required to be encapsulated in concrete and disposed of through a safe method. A worker said that there were indeed dielectric oils containing PCBs at the installation, and that these could be differentiated from non-PCB oils by the odour.

The available information in Mexico thus indicates that PCBs are:

- distributed in sites located throughout the whole country; and
- concentrated in substations, power installations, and industrial complexes.

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IV. CURRENT OPTIONS AVAILABLE IN MEXICO FOR THE STORAGE, HANDLING, AND DESTRUCTION OF PCBs

A. STORAGE

Although currently there are no commercial PCB storage facilities in Mexico, the *Comisión Federal de Electricidad (CFE)*, Federal Electricity Commission, has several storage centers throughout the country that are designated for PCBs. In addition, nearly all their installations, warehouses, and substations store dielectric oils that may or may not contain PCBs. For *CFE*, storage facilities must conform to the regulation CFE/SHTI Núm. 11-1.4.1 — *Almacenaje previo al Destino final de Askareles* (Storage Prior to the Final Destination of PCBs). Periodic inspections must be performed on a quarterly basis. The following are some of the main provisions of the *CFE* guidelines, which are those most widely followed in Mexico:

a) To reduce the possibility of accidents, PCBs will only be extracted from equipment which is of inadequate volume or is leaking.

b) The transfer of PCB-containing fluids from equipment to storage containers must be done using (pressure) pumps and pipes/hoses.

c) Equipment and material must be stored in specified metal containers that have been treated to resist corrosion and have grooved (pressure-sealed) lids.

Contaminated clothes and gloves will be immediately placed in plastic bags, sealed, and labeled with the following legend: *"PELIGRO MATERIAL CONTAMINADO POR ASKARELES"* (DANGER: PCB-CONTAMINATED MATERIAL). These plastic bags will be deposited in adequate containers for storage.

Once the materials contaminated with or containing PCBs (transformers, ballasts, condensers, capacitors and, in general, all minor equipment) have been placed in storage containers, before sealing, the containers must be packed securely (using contaminated clothes, for example, as filling material). Then, using metallic straps, epoxy resins, or electric welding, the lids are secured and the containers are labeled with the information shown in Appendix 1.

When a 200-litre storage container is filled with PCBs, as a safety measure only 190 litres is introduced. This will help avoid leaks or spills caused by fluctuations in the volume and pressure of the liquid resulting from temperature variations. Before the container is filled, the lid must be welded shut, leaving the filling orifice, screw cap, and o-ring open for introducing the PCBs. To avoid spills, the cap is then sealed.

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B. Confinement Areas

These are areas recommended for PCB-containing materials and equipment so that accidental leaks of PCBs from electrical equipment in operation or out of use are controlled. Site selection must consider all possible factors, but particularly the location of seismic zones, and potable water and sewage systems.

See Table 3 for the materials recommended and not recommended for the construction of confinement areas.

Table 3: PCB Confinement Area Construction Materials

Recommended	Not Recommended
• Wood, paper, cardboard, cork, asbestos, glasses, ceramics, bakelite, sand, aluminium, brass, steel, copper, galvanized steel	• Organic materials • Varnishes, shellacs, and commercial paints • Acrylic resins (polymetachrylates) • Chlorosulfonated polyethylene
• Vinyl, silastic and Teflon materials • Glyptal 1276 Cement (General Electric) • Epoxy cements • Non-grease orange shellac • Resin paints (epoxyurethane)	• PVC (vinyl chlorides) • Polyvinyl formol • Natural rubber, neoprene rubber

Substations and sites where PCB-contaminated items are placed will be considered as confinement areas, and must therefore adhere to the following guidelines:

a) Possess adequate ventilation (artificial or natural).

b) Have a concrete floor with cracks and drains sealed.

c) Berm around the perimeter to contain spills with an intact, non-leaking retaining wall of sufficient height to contain the volume of all the equipment.

d) For greater safety, trays can be placed under the electric equipment. These must provide adequate space for cleaning and inspection activities. Lifting of equipment must be accomplished using the handling points designed for the purpose.

e) The floor and any trays should be covered with a PCB-resistant paint.

f) Before painting, surfaces should be cleaned using an industrial solvent.

g) A good seal between the perimeter retaining wall and the concrete floor of the confinement area should be obtained. It is recommended that the wall be anchored with rods 1.5 cm in diameter drilled into the floor, with separations between them of not

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more than 1 m, and the area sealed with a concrete adhesive.

h) If underground ducts have been employed for wiring installation, these must be sealed with an adequate PCB-proof material.

i) Stormwater drainage from the roof must discharge outside the confinement area.

j) A fence and gate must be used to control access.

The only private company to have operated a PCB storage installation in Mexico is Chemical Waste Management in El Salto, Jalisco.

C. PCB Management

The management of PCBs in Mexico as of 1995 is a product of a number of factors which result, on one hand, from the relative inattention to them during the last decades, and on the other, from a remarkable effort during recent months to address effectively the concerns of integral PCB management. This recent emphasis is reflected in the work agenda for industrial hazardous wastes management, including PCBs.

The Work Program of *Secretaría del Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP)*, the Secretariat of Environment, Natural Resources and Fisheries, published in 1995 in the "Principles and Orientation," and the Work Program of *INE*, include the following:

- fulfill Organization for Economic Cooperation and Development (OECD) guidelines regarding information on hazardous waste movements;
- promote industrial investment in hazardous waste management infrastructure;
- assess and design regulatory and technological exchange programs for waste reduction;
- supervise World Bank hazardous waste projects in the northern border region;
- develop a systematic approach for issuing guidelines regarding the transboundary movements of hazardous wastes (Haztracks-EPA);
- create an information system and data base of environmental impact statements and an inventory of hazardous waste generation;
- develop a national atlas for locating hazardous waste management installations;
- regulate any chlorinated compounds used as industrial materials which generate major hazardous waste streams;
- aid in the further development of regulations pertaining to the transboundary movements of hazardous wastes generated by the *maquiladora* industry;
- design remediation procedures and standards for contaminated sites;
- call for the establishment of an advisory council on issues involving hazardous wastes, materials, and activities;
- revise the hazardous wastes list to be compatible with the OECD list (NOM-001);

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- find ways to increase the efficiency of technical decisions on projects and proposals;
- develop regulations for the physico-chemical treatment of hospital and other hazardous wastes (including thermal treatment);
- develop standards for the handling of used tires and lubricants;
- evaluate dioxins and other polychlorinated chemicals;
- develop protocols, evaluation methodologies, and regulations for alternative fuels; and
- evaluate and promote exportation mechanisms and markets for hazardous wastes (including PCBs).

Aside from the new *SEMARNAP* vision, everyday situations and facts underscore the urgent need for these new policies, especially when the potential for harmful environmental impacts that could have been caused by inadequate PCB management is seen.

ERM-México has concluded that Mexico lacks a prevention and protection culture related to PCBs, both in the workplace and in the domestic environment. There are no public information documents, educational materials, or procedural instructions for industry. Health guidelines do not exist for PCB use or authorization, nor for the abandonment of PCB-contaminated sites and equipment.[2]

[2] In January 1996, the *Dirección General de Residuos, Materials y Riesgo*, General Direction of Wastes, Materials, and Risk, of the *Instituto Nacional de Ecología (INE)* published a report entitled "PCBs" which includes chapters on PCB handling technologies, administrative procedures for authorizations, and criteria control mechanisms for PCB handling.

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V. INVENTORY OF SOME OF THE PRINCIPAL COMPANIES INVOLVED IN PCB MANAGEMENT

In 1984, the Mexican environmental authorities started the assessment of PCB destruction options. Knowing that certain cement manufacturers in the United States and Canada had destroyed PCBs in their furnaces, the Mexican government contacted cement plants through the *Cámara Nacional del Cemento (CANACEM)*, National Cement Association, to study the feasibility of destroying PCBs in their facilities.

In 1985, the Compañía Tolteca offered one of its plants to conduct pilot tests. In 1986, after a number of visits to their plants by technical personnel from *SEDUE*, *CFE*, and Tolteca, a PCB destruction process flow-chart was conceptualized and designed. The test burn was conducted in a calcination furnace at an average temperature of 1,440°C and a residence time of four seconds. However, the company was reluctant to continue the process, fearing possible negative publicity if the cement were to become contaminated with PCBs.

In November 1987, companies registered as PCB owners again met with the *Secretaría de Desarrollo Urbano y Ecología (SEDUE)*, Secretariat of Urban Development and Ecology. In March 1988, *CFE* released an inventory of 1,870,362 litres (2,713 metric tonnes) total PCBs: 1,521,228 litres (2,207 metric tonnes) in-use, and 349,241 litres (506 metric tonnes) out-of-use.

Four companies authorized by the U.S. EPA that had been offering their services were invited to bid on a PCB disposal contract. A group consisting mainly of PCB owners and operators worked together with *SEDUE* under the supervision of the Internal Controllership and the General Direction for the Environmental Pollution Prevention and Control to certify the bidding process. On 28 June 1988, the TEESA Company (a subsidiary of Chemical Waste Management International) was awarded the contract to destroy the PCBs in Mexico, but this company was never authorized to incinerate PCBs.

Currently, the only legal disposal option in Mexico is exportation of PCBs to countries willing to receive them for incineration. Presently in Mexico, there is only one installation authorized for low concentration PCB-decontamination: S.D. Myers de México, S.A. de C.V.

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Table 4. List of Companies authorized by the *Instituto Nacional de Ecología (INE)* for the Handling of PCBs

Company	Address	Activity and Authorization Number
Chemical Waste Management de México	Mr. R. David McConnell Km. 14.5 Carretera Tijuana-Ensenada, B.C. Tel.: (525) 202-7999	Lic. No. 4165 Oficio 411-5387 September 9, 1988 (for exportation)
Chemel, S.A. de C.V.	Ing. José Manuel Avelar G. Ave. Insurgentes Sur No.1480 12° Piso Col. Insurgentes Mixcoac México, D.F. Tel.: (525) 524-3960 Fax: (525) 534-2119	No. 9-3-PS-VI-12-94 (for exportation)
Ecología Laboratorios y Consultores de México, S.A. de C.V.	M.C. Edith Emiko Misayako División del Norte Col. Del Valle 03100 México D.F. Tel.: (525) 543-9799 Fax: (525) 543-9657	No. 9-3-PS-VI-11-94 (for exportation)
S.D. Myers de México, S.A. de C.V.	Ing. Humberto F. Ramon Benito Juárez No. 104 San Lucas Tepetlacalco 54050 Tlalnepantla Edo. de México Tel.: (525) 398-5999 Fax: (525) 398-8150	No. 15-14-PS-V-B-95 (for decontamination of PCBs with less than 5,000 ppm)

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A. Chemical Waste Management de México, S.A. de C.V.

Chemical Waste Management de México, S.A. de C.V. (CWM) is the principal PCB management company in Mexico. They constructed TEESA, a subsidiary facility in Tijuana, Baja California, which was approved for PCB incineration in 1986, but later shut down. TEESA obtained a contract for the PCB incinerator in June 1988, but as a consequence of social pressures and political maneuvering, the installation was never granted a licence to operate and so never began commercial operation. This authorization was to be signed by Patricio Chirinos, the *SEDUE* Secretary at that time, who, a few days before the scheduled signing, was nominated as candidate of the PRI for the Government of the State of Veracruz. Currently, CWM operates a PCB storage installation in El Salto, Jalisco. In early June 1995, 650 metric tonnes of PCBs were moved from this facility to Veracruz for eventual shipment to Finland where CWM operates an authorized incinerator (McAllen, 1995).[3] Currently, CWM is planning to arrange for the thermal destruction of 1,600 metric tonnes of PCBs that have accumulated in the El Salto transfer station.

Companies trying to export their PCBs for destruction are under pressure from the recipient countries, and depend upon their decision to accept imported PCBs. Thus the exporting countries must rely on factors out of their control to resolve their PCB management problems. CWM considers that opening the Mexico-United States border for PCB shipment to disposal facilities in the U.S. could reduce the risks of transoceanic exportation.[4]

B. S.D. Myers de México, S.A. de C.V.

With the authorization of the *Instituto Nacional de Ecología (INE)*, S.D. Myers de México, S.A. de C.V. operates a mobile unit based in Atlacomulco, State of Mexico, for the treatment of oils containing less than 5,000 ppm PCBs. PCB decontamination is achieved by catalytic destruction of the contaminated oils without the necessity of removing them from the transformers. The current capacity of the mobile unit is 150 metric tonnes per month. The plant has also been authorized to construct a stationary installation with a capacity of 1,200 metric tonnes a month. The projected costs would be one-half those of the other exportation options.

There are several other companies which are in the process of becoming authorized but, as of the date of this report, they have not received *INE* approval. Most of these are international companies with the capability of various PCB treatment methods. Among these companies are EcoLogic and PERFOTEC.

[3] As of 31 March 1996, *INE* had granted permits for the exportation of 1,528 metric tonnes of PCBs. Of this amount, 1,350 metric tonnes were exported to Finland and 178 metric tonnes to England for incineration.

[4] See footnote number 3.

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C. EcoLogic Inc.

This company plans to introduce a mobile treatment unit that can destroy PCBs at a cost of only 53 percent of the current processing rates. According to the president of the company, *INE* officers seem receptive to the project, which would cost about US $5 million. EcoLogic and the government are expected to sign an agreement at the end of 1995 and that construction is planned to start at the beginning of 1996. It was projected that within the first 15 months of operation between 6,000 and 8,000 metric tonnes of PCBs stored in Mexico could be destroyed. Dioxins and furans, which are the hazardous by-products of some PCB incineration processes, are not generated by the EcoLogic process since it uses extremely high temperatures to break the chemical bonds, producing a gas composed of nitrogen, carbon dioxide, water vapor, hydrogen, and methane. During EPA tests, the EcoLogic SE25-ELI Destroyer System destroyed 99.9999 percent of PCBs and toxic hydrocarbons.

D. PERFOTEC

The PERFOTEC Company, associated with the Canadian Cintec Group, operates a system, not yet authorized, for the management and decontamination of liquid PCBs, or PCB-contaminated materials. At the time of this report, the company is performing tests with mobile units, decontaminating liquid PCBs and contaminated materials in the former *PEMEX* Azcapotzalco refinery in Mexico City.

The technology is a sophisticated treatment system that can be used for high or low PCB concentrations. The main stages of the process are: extraction; autoclaving; solvent recovery by fractional distillation; storage; and elimination.

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VI. STRATEGY FOR DISCUSSING THE TRANSBORDER MOVEMENT OF PCBS

From a technical point of view, ERM-México believes that the problem of PCBs in North America, and especially in Mexico, can be resolved within a period of 5 to 10 years and that the real problem is related to political decisions and the application of current laws.

The barriers to adequate management of PCBs include:

- a lack of knowledge regarding the potential impacts of PCBs on human health and the environment;
- the cost to the generators for PCB disposal;
- the lack of specific legislation and strong enforcement measures;
- the distribution of PCBs;
- the lack of awareness regarding PCB management and handling;
- the lack of a prioritized program for the elimination of spills and leaks of PCBs; and
- the lack of political resolve to address the problem.

To resolve the PCB problem, strategies for consideration at the international negotiating table could include the following elements:

- taking an attitude of reciprocity in defining equivalent allowances of importation and exportation between countries;
- authorizing installations under similar procedures and emission standards;
- authorizing the use of appropriate PCB destruction methods;
- promoting education and management policies which are designed to reduce the impact on health and the environment;
- promoting cooperation between regulatory agencies;
- learning from the experiences of other countries;
- promoting the establishment of teams for transboundary emergency response; and
- sharing available information.

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VII. CONCLUSIONS

ERM-México has concluded that there are significant gaps in Mexican environmental legislation related to PCBs, and there is a need to develop specific standards and procedures for the management of the following:

- PCB sampling and analysis;
- labelling of PCBs and PCB-contaminated materials;
- recordkeeping;
- PCB storage;
- PCB emergency response planning;
- repair of PCB-containing transformers;
- remediation of PCB-contaminated sites;
- PCB disposal and treatment techniques;
- worker training for PCB handling; and
- protective equipment required for PCB handling.

ERM-México summarized the different viewpoints prevailing in official publications and among the government officials interviewed as follows:

- the best option for Mexico is thermal destruction in foreign countries;
- the generators of PCBs have not fulfilled their obligations;
- with one exception, PCB storage installations currently in use have not been authorized by the *INE*, but known locations of PCB storage, even unauthorized, are under control;
- there is no detailed inventory of PCBs;
- there is no information on PCB spills;
- in the past, PCBs have not had high priority; and
- the volume of PCBs has been reduced.

Officials in the electricity-producing sector maintain that:

- environmental authorities will authorize PCB disposal technologies;
- workers having contact with PCBs are properly trained;
- efforts to isolate PCBs from the environment have been undertaken;
- incineration is the most effective disposal method;
- the situation is under control and there have been no significant discharges to the environment;
- the *CFE* does not have more than 2,000 metric tonnes of PCBs;
- protection equipment is available; and
- emergency response systems are available for use.

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The viewpoints of companies proposing disposal options for PCBs include:

- the most practical solution is to reduce the distance that PCBs must be transported. Therefore, the capacity for handling them locally must be encouraged and trans-oceanic exportation discouraged;
- in Mexico, companies are not yet authorized to handle high concentration PCBs, therefore, the only legal disposal option is exportation;
- the Mexican government has not defined a clear procedure for PCB handling;
- the establishment of regulations for PCB incineration should be a major priority; and
- despite having fulfilled all requirements, the only incinerator constructed in Mexico was not authorized to operate because of public protests.



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APPENDIX A - FORMATO

FORMATO de manifestación para empresas generadoras eventuales de residuos de Bifenilos Policlorinados (BPCs), provenientes de equipos eléctricos.

Al margen un logotipo que dice: Secretaría de Desarrollo Urbano y Ecología. (Subsecretaría de Ecología.)Dirección General de Prevención y Control de la Contaminación Ambiental.

SECRETARÍA DE ECOLOGÍA

DIRECCIÓN GENERAL DE PREVENCIÓN Y CONTROL
DE LA CONTAMINACIÓN AMBIENTAL

MANIFIESTO PARA EMPRESAS GENERADORAS EVENTUALES DE RESIDUOS DE BIFENILOS POLICLORINADOS (BPCS)

PROVENIENTES DE EQUIPOS ELÉCTRICOS

PARA SER LLENADO POR SEDUE CÓDIGO DE IDENTIFICACIÓN

1. IDENTIFICACIÓN DE LA EMPRESA GENERADORA

1.1 Razón social de la Empresa _____ Tel. _____

1.2 Dirección y C.P._____ Mpio. _____ Edo. _____

1.3 Giro según clave CMAP _____

1.4 Nombre del Técnico Responsable_____

2. IDENTIFICACIÓN DE LA EMPRESA PRESTADORA DE LOS SERVICIOS DE MANEJO

2.1 Razón Social de la Empresa_____ Tel. _____

2.2 Registro de SEDUE (Código de Identificación) _____

2.3 Nombre del Responsable_____ Tel. _____

2.4 Servicios Contratados:
___Cambio de fluido ___ Envasado ___ Almacenamiento temporal
___ Otros

3. CARACTERÍSTICAS Y CANTIDADES DE LOS RESIDUOS DE BPCs O CONTENIENDO BPCs

3.1 Askarel Puro: 3.1.1 ___ Inerteen 3.1.2 ___ Pyranol ___ Clophen 3.1.4 ___ Otro ___ lts. ___ kgs.

3.2 Fluidos contaminados:
Clase de fluido _____ Contaminación en p.p.m. ___ lts. ___ kgs.
Clase de fluido _____ Contaminación en p.p.m. ___ lts. ___ kgs.

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3.3 Sólidos contaminados o embebidos
Tipo de Sólido _____ kgs.
Tipo de Sólido _____ kgs.

3.4 Capacitores (*)
Marca _____ Potencia _____ KVAR Tensión V Dimensiones x __ cm __ Peso Total kgs. ____
Nombre del fluido _____ Año de fabricación _____ Cantidad de fluido ____ lts. ____ kgs.

4. ENVASADO Y CANTIDAD POR ENVASE

4.1 Tipo de envase: 4.1.1 __ Tambores metálicos de 208 lts (55 gal) 4.1.2 __ Otros

4.2 Identificación y cantidad por envase (*)

4.2.1 N° de identificación	4.2.2 Descripción del contenido	4.2.3 lts.	kgs.

5. IDENTIFICACIÓN DE LOS EQUIPOS

5.1 (Cambio de fluido de otro equipo de transformador (es) (°)
Marca _____ N° de Serie _____ Potencia _____ KVA Tensiones V/ __V Año _____
Marca _____ N° de Serie _____ Potencia _____ KVA Tensiones V/ __V Año _____
Marca _____ N° de Serie _____ Potencia _____ KVA Tensiones V/ __V Año _____

5.2 Cambio de fluido de otro equipo (especificar características) _____

5.3 Ubicación de los equipos cuyo fluido fue cambiado
Calle y N° _____ Entre Calle _____ y Calle _____
Colonia _____ Municipio _____ Delegación _____ Estado ___

5.4 Desmontaje y Puesta fuera de Servicio _____

6. LUGAR DE ALMACENAMIENTO TEMPORAL PREVIO A SU INCINERACIÓN
Calle y N° _____ Entre Calle _____ y Calle _____
Colonia _____ Municipio _____ Delegación _____ Estado ___

7. CERTIFICACIÓN DEL GENERADOR: DECLARO QUE TODA INFORMACIÓN INCLUIDA EN ESTE MANIFIESTO ES COMPLETA Y VERÍDICA.

LUGAR Y FECHA NOMBRE Y FIRMA DEL RESPONSABLE

(*) En caso de ser necesario agregar hojas adicionales

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SECRETARÍA DE DESARROLLO URBANO Y ECOLOGÍA

SUBSECRETARÍA DE ECOLOGÍA
DIRECCIÓN GENERAL DE PREVENCIÓN Y CONTROL DE LA CONTAMINACIÓN AMBIENTAL

MANIFIESTO PARA EMPRESAS GENERADORAS EVENTUALES DE RESIDUOS DE BIFENILOS POLICLORADOS (BPCs) PROVENIENTES DE EQUIPOS ELÉCTRICOS

INSTRUCTIVO

RECUADRO SUPERIOR DERECHO. (Para uso exclusivo de SEDUE

1.—IDENTIFICACIÓN DE LA EMPRESA GENE-RADORA.

1.1. — RAZÓN SOCIAL DE LA EMPRESA. — Deberá indicarse el nombre o razón social de la empresa generadora de los residuos.

TELÉFONO. — Asentar número(s) telefónico(s) del responsable de la empresa generadora, incluyendo según sea el caso, extensión y clave lada.

1.2. — DIRECCIÓN Y C.P. — Calle y número donde se ubica la empresa, ciudad, parque o corredor industrial y Código Postal.

MUNICIPIO. — Nombre del Municipio.

ESTADO. — Nombre de la entidad federativa.

1.3. — GIRO SEGÚN CLAVE CMAP. — Clave del giro de acuerdo al Catálogo Mexicano de Actividades de la S.P.P.

1.4. — NOMBRE DEL TÉCNICO RESPONSABLE. Nombre completo del técnico responsable de la empresa generadora.

TELÉFONO. — Asentar número telefónico del técnico responsable de la empresa generadora, incluyendo según sea el caso, extensión y clave lada.

2. — IDENTIFICACIÓN DE LA EMPRESA PRES-TADORA DE LOS SERVICIOS DE MANEJO.

2.1 — RAZÓN SOCIAL DE LA EMPRESA. — Nombre o razón social de la empresa prestadora de los servicios de manejo de los residuos.

TELÉFONO. — Asentar número telefónico de la empresa prestadora de los servicios de manejo de los residuos, incluyendo según sea el caso, extensión y clave lada.

2.2. — Registro ante SEDUE (Código de Iden-tificación). — Anotar el Código de Identificación con el cual la empresa presentadora de los servicios de manejo se encuentra registrada ante SEDUE.

2.3. — NOMBRE DEL RESPONSABLE. — Nombre completo del responsable por parte de la empresa prestadora de los servicios de manejo de los residuos.

TELÉFONO. — Número telefónico del responsable por parte de la empresa prestadora de los servicios de manejo de los residuos de manejo de los residuos incluyendo según sea el caso, extensión y clave lada.

2.4. — SERVICIOS CONTRATADOS. — Cruzar el cuadro correspondiente a el (los) servicio(s) que proporcionará la empresa prestadora de los servicios de manejo, en le caso de Otros, indicar claramente de que servicios se trata.

3. — CARACTERÍSTICAS Y CANTIDADES DE LOS RESIDUOS DE BPC's O CONTENIENDO BPC's.

3.1. — ASKAREL PURO. — En el caso de tratarse de puro askarel, cruzar el cuadro que corresponde al nombre comercial.

3.1.1. — Inerteen, nombre comercial del askarel de equipos construidos por General Electric.

3.1.2. — Pyranol, nombre comercial del askarel de equipos construidos por General Electric.

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3.1.3. — Clophen, nombre comercial del askarel fabricado por Bayer.

3.1.4. — Otro, anotar claramente el nombre comercial del askarel de que se trate.

LTS. — Número total de litros de askarel puro.

KGS. — Número total de kilogramos de askarel puro.

3.2. — FLUIDOS CONTAMINADOS. — En el caso de tratarse de fluidos contaminados con BPC's distintos del askarel puro, como por ejemplo: agua, aceite, etc. anotar en cada renglón un fluido en el caso de tratarse de más de uno.

CLASE DE FLUIDO. — Nombre del fluido.

CONTAMINACIÓN EN P.P.M. — Grado de contaminación con BPC's del fluido en partes por millón.

LTS. — Número de litros de cada fluido contaminado.

KGS. — Número de kilogramos de cada fluido contaminado.

3.3. — SÓLIDOS CONTAMINADOS O EMBEBI-BIDOS. — En caso de tratarse de sólidos contaminados o impregnados con askarel o fluidos contaminados en cualquier proporción con BPC's como por ejemplo, suelos, maderas, papeles, cartones, trapos, estopas, etcétera.

KGS. — número de kilogramos de cada sólido.

3.4. — CAPACITORES — En caso de que los resi-duos sean capacitores eléctricos en desuso, deberán asentarse los datos solicitados de cada capacitor, agregando hojas adicionales en caso de ser necesario.

MARCA — Marca de fabrica de cada capacitor.

POTENCIA — De cada capacitor en kilo volt amper reactivos (KVAR).

TENSIÓN — Voltaje nominal de utilización en Volts (V).

DIMENSIONES — Alto, ancho y profundidad en centímentros (cm).

PESO TOTAL — Peso de cada capacitor completo.

NOMBRE DEL FLUIDO — Nombre comercial del fluido refrigerante del capacitor que contiene BPC's.

AÑO DE FABRICACIÓN — Año en que fue construido el capacitor.

CANTIDAD DE FLUIDO — Cantidad en litros y en kilogramos del fluido que contiene cada capacitor.

4. — ENVASADO Y CANTIDAD POR ENVASE.

4.1. — TIPO DE ENVASE — En los cuales se haya colocado el askarel, los fluidos o los sólidos contaminados, cruzar el cuadro correspondiente.

4.1.1. — TAMBORES METÁLICOS DE 208 LTS. (55 GAL.) — En caso de tratarse de tambores comu

nes de acero.

4.1.2. — OTROS — Indicar claramente si se trata de otros envases, material, capacidad, tipo de cierre, etcétera.

4.2. — IDENTIFICACIÓN Y CANTIDAD POR ENVASE — Utilizar un renglón para cada envase, en caso de ser necesario agregar hojas adicionales.

4.2.1. — No. DE IDENTIFICACIÓN — Anotar el número identificatorio de cada envase.

4.2.2. — DESCRIPCIÓN DEL CONTENIDO — Indicar claramente el tipo de residuo contenido en cada envase.

4.2.3. — LTS KGS — Anotar en cada caso la cantidad en litros y en kilogramos.

5. — IDENTIFICACIÓN DE LOS EQUIPOS — Cruzar el cuadro que corresponda al trabajo al que se trate, en caso de ser necesario agregar hojas adicionales.

5.1. — CAMBIO DE FLUIDO DE TRANSFORMA-DORES — Utilizar un renglón para cada transformador, anotando en cada uno de los datos solicitados.

MARCA — Marca de fábrica de cada

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transformador.

NUMERO DE SERIE — Anotar el número de serie o número identificatorio.

POTENCIA — De cada transformador en kilo volt ampers.

TENSIONES — Voltaje(s) primario(s) Voltaje(s) secundario(s). Indicados en Volts.

AÑO — Año en que fue construido el transformador.

5.2. — CAMBIO DEL FLUIDO DE OTRO EQUIPO (ESPECIFICAR CARACTERÍSTICAS) — En caso de tratarse de por ejemplo: interruptores, intercambiadores, etc.

5.3. — UBICACIÓN DE LOS EQUIPOS CUYO FLUIDO FUE CAMBIADO — Indicar datos para la ubicación del lugar en que se encuentran los equipos.

5.4. — DESMONTAJE Y PUESTA FUERA DE SERVICIO — En caso de tratarse de equipos que son descartados y pasan a desuso.

6. — LUGAR DE ALMACENAMIENTO TEMPO-RAL Y PREVIO A SU INCINERACIÓN — Anotar la calle y el número exterior e interior, entre que calles, Colonia, Municipio, Delegación y Entidad Federativa.

7. — CERTIFICACIÓN DEL GENERADOR — LOS DATOS ANOTADOS EN EL PRESENTE MANI-FIESTO POSEEN VALOR TESTIMONIAL POR LO QUE DEBEN AJUSTARSE ESTRICTAMENTE A LA VERDAD Y SER LO MAS COMPLETOS POSIBLES.

LUGAR Y FECHA — Lugar en donde fue requisitado el manifiesto, así como la fecha de su llenado.

NOMBRE Y FIRMA DEL RESPONSABLE — Nombre completo y firma de la persona responsable por parte de la empresa generadora.

ESTE MANIFIESTO DEBE LLENARSE POR TRIPLICADO SIENDO LA DISTRIBUCIÓN DEL ORIGINAL Y COPIA COMO SIGUE:

ORIGINAL PARA LA EMPRESA GENERADORA.

DUPLICADO PARA SEDUE.

TRIPLICADO PARA LA EMPRESA PRESTA-DORA DE SERVICIOS DE MANEJO.

MANIFESTACIONES DEL IMPACTO AMBIENTAL DISPONIBLES PARA CONSULTA AL PUBLICO

Con fundamento en lo dispuesto en el articulo 33 de la Ley General del Equilibrio Ecológico y la Protección al Ambiente y los artículos 39 y 40 de su Reglamento en Materia de Impacto Ambiental, se informa sobre los expedientes que a continuación se señalan, mismos que podrán ser consultados previa identificación del interesado en horas y días hábiles en el Centro de Información Documental de la Subsecretaría de Ecología, ubicada en Río Elba No. 20, planta baja, Col. Cuauhtémoc, Código Postal 06500.

Nombre y tipo de proyecto:

Proyecto Durango MP 1 de fabricación de papel.

Localización:

Km. 26 de la carretera Durango-México, Municipio de Durango, Dgo.

Promovente:

Industrias Centauro mediante papeles Centauro, S.A. de C.V.

Disponible para consulta a partir de:

7 de junio de 1990.

Nombre y tipo de proyecto:

Proyecto Campestre de Acapulco

Localización:

Distrito de Tabares, Municipio de Acapulco, Guerrero.

Promovente:

Luis Sierra y Copropietarios.

Disponible para consulta a partir de:

7 de junio de 1990.

Nombre y tipo de proyecto:

Proyecto Torre "D" Hotel Stouffer Presidente Cozumel.

Localización:

Isla de Cozumel, municipio de Cozumel, Q. Roo.

Promovente:

Inversiones Turísticas del Caribe, S.A. de C.V.

Disponible para Consulta a partir de:

LEXOLDMON003486

7 de junio de 1990.

Nombre y tipo de proyecto:

Proyecto de Desarrollo Turístico Puerta de Hierro-Acapulco.

Localización:

Pichilingüe, Municipio de Acapulco, Guerrero.

Promovente:

Empresa Constructora e Inmobiliaria Ragon, S.A. de C.V.

Disponible para consulta a partir de:

7 de junio de 1990.

Nombre y tipo de proyecto:

Proyecto de instalación de la compañía Crom Química, S.A. de C.V.

Localización:

Calle Morelos No 21 Col. Tecamachalco, Los Reyes, La Paz, Estado de México.

Promovente:

Crom, Química, S.A. de C.V.

Disponible para consulta a partir de:

7 de junio de 1990.

Nombre y tipo de proyecto:

Proyecto Polimar, S.A. de C.V., de instalación de una planta para producir 20,000 ton/año de A.B.S.

Localización:

Puerto Industrial de Altamira, Tamaulipas.

Promovente:

Proyecto Polimar, S.A. de C.V.

Disponible para consulta a partir de:

4 de julio de 1990.

Nombre y tipo de proyecto:

Proyecto Terminal Marítima de Industrias Negromex, Altamiras, Tamaulipas.

Localización:

Puerto Industrial de Altamira, Tamaulipas.

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APPENDIX B - PRINCIPAL INTERVIEWS

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CFE

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Municipal and Special Wastes
Instituto Nacional de Ecología

Ing. Gabriel Villaseñor
Director of Waste Management

Ing. Guillermo Elizondo
Director of Operations
PERFOTEC

Ing. Jorge Sánchez
Instituto Nacional de Ecología

Ing. Jorge Villaseñor
Cámara Nacional de la Industria del
Cemento

Ing. Juan Manuel Diosdado
Cementos Mexicanos, S.A.

Ing. Luis Calderón
Assistant attorney for Audits
Profepa

Ing. Luis Wolf
Mexico-USA Border Affairs
Instituto Nacional de Ecología

Ing. Marco Antonio Ayala
CFE-Southcentral Zone
Valle de Bravo Distribution Center

Ing. Mario Lobera Moya
Chief of the Environmental
Engineering Department, CFE

Ing. Miguel Muñoz
Border Affairs
Instituto Nacional de Ecología

Ing. Roberto Herrera
General Director
Pro Ambiente

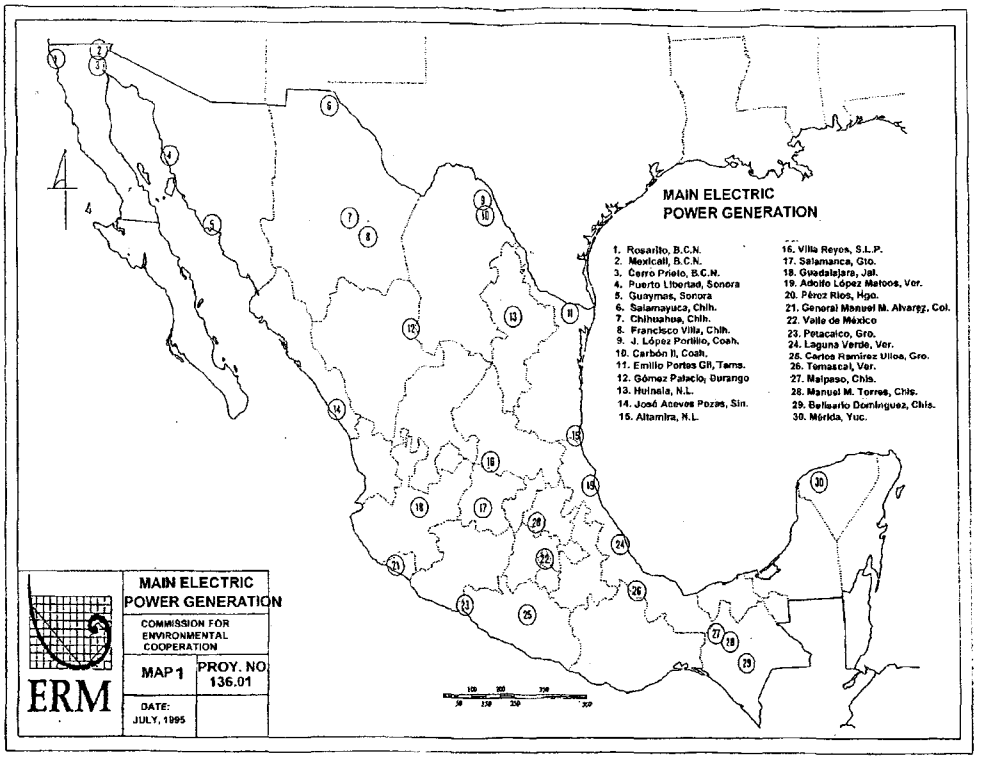
Ing. Sergio Riva Palacio
Instituto Nacional de Ecología

Lic. Beatriz Bugeda
Commission for Environmental
Cooperation

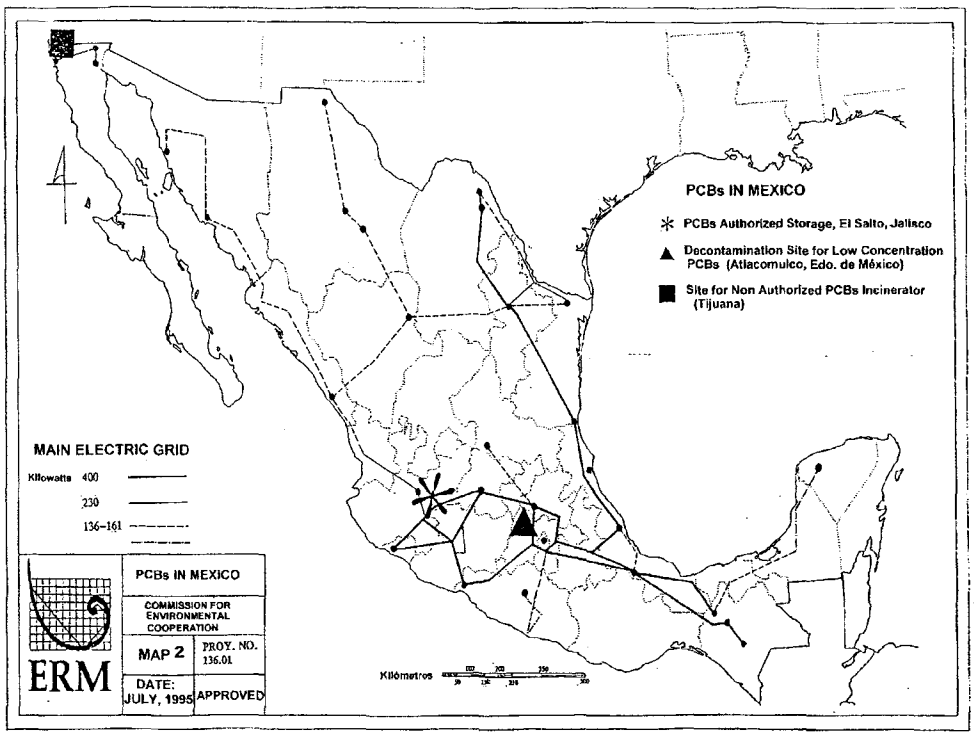
Lic. José Luis Samaniego
SEMARNAP

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APPENDIX C - MAPS



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COUNTRY PAPER

STATUS OF PCB MANAGEMENT IN THE UNITED STATES

PREPARED FOR:

COMMISSION FOR ENVIRONMENTAL COOPERATION

PREPARED BY:

ROSS & ASSOCIATES
ENVIRONMENTAL CONSULTING, LTD.

AUGUST 1995

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ACRONYMS

CEC	Commission for Environmental Cooperation
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System (Superfund Information System)
DRMO	Defense Reauthorization and Marketing Office
EPA	Environmental Protection Agency (USA)
EPRI	Electric Power Research Institute
ETC	Environmental Technology Council
NAAEC	North American Agreement on Environmental Cooperation
NPL	National Priorities List
OECD	Organization for Economic Cooperation and Development
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
TSCA	Toxic Substances Control Act

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I. INTRODUCTION

Polychlorinated biphenyls (PCBs), a class of chlorinated, chemical compounds well-known for their toxicity and persistence in the environment, are banned or tightly restricted in the United States, Canada, and Mexico. As equipment that contains PCBs is removed from service, it must be disposed of properly to protect against human health and environmental risk. However, the regulations, infrastructure, and capacity to handle and dispose of PCBs varies greatly between the three countries, setting up a system of uneven management options across the continent.

The Commission for Environmental Cooperation (CEC), formed under the North American Agreement on Environmental Cooperation (NAAEC), has recognized the importance of encouraging accelerated phase-out and destruction of hazardous substances, including PCBs, as part of its overall goal to reduce pollutants in North America. In light of these differences, the CEC has undertaken a study of the transboundary issues associated with PCB disposal to help develop a strategy for exploring PCB management options in North America.

As part of this study, the CEC is developing a base of background information about PCB regulations, inventory, management options, and disposal capacity in each country. The CEC seeks to understand how PCBs are regulated in each country, the ability of each country to manage its PCBs for disposal, and the issues and barriers that each country faces for developing a continental strategy for PCB management. Such a strategy would potentially involve importing and exporting PCBs across borders for disposal. In studying this issue, the CEC recognizes that the United States has the largest PCB disposal capacity of the three countries; that the United States borders are currently closed to import and export of PCBs except through a regulatory exemption process; and that the Environmental Protection Agency (EPA) is in the midst of a rulemaking that could alter the manner in which PCBs are regulated in the United States, including the process for importing and exporting PCBs for disposal.

This report represents the background information for the United States. Companion pieces have been prepared for PCB regulations, inventory, and disposal capabilities in Canada and Mexico.[1]

Part II of this report summarizes the applicable laws and regulations that govern PCB management in the United States. Because the focus of the report is an understanding of the issues that affect import and export of PCBs, the relevant regulations include import and export, storage, disposal, marking and record-keeping, spill cleanup, and transportation.

Part III reviews the PCB inventory and infrastructure in the United States. The primary focus is on the disposal capacity in the United States because, under an open border policy, it is likely that more PCBs would be imported into the United States than exported to Canada or Mexico.

[1] Proctor & Redfern, Limited, *Status of PCB Management in Canada*, September 1995; ERM-México, *Status of PCB Management in Mexico*, August 1995.

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Part IV discusses the international agreements that would be relevant if the United States opened its borders to PCB disposal.

Finally, Part V describes the arguments that support and oppose opening the United States border for disposal of PCBs.

Taken together, the three background reports will present an overview of the PCB situation in North America and enable the CEC to understand the issues involved in a transboundary disposal strategy.



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II. PCB REGULATORY OVERVIEW

In the United States, PCBs are a class of chemical substances singled out for a special control. The Toxics Substances Control Act (TSCA), which sets up a general structure for regulating toxic chemicals, includes a separate section devoted only to PCBs.[2] Regulations for PCBs have filled hundreds of pages of Federal Register notices and comprise more than 70 pages in the Code of Federal Regulations. No other chemical faces this level of control under TSCA. Unlike many of the environmental statutes in the United States, the TSCA program is not delegated to the states. PCBs are also regulated either directly or indirectly under a number of other Federal laws which can provide routes for states to control PCBs.

This report focuses on the TSCA rules because they shape the types of uses and disposal options allowed in the United States. PCB releases are also regulated by the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, because these laws are secondary to the overall PCB regulatory framework imposed by TSCA and do not currently affect import/export discussions, they are not described in this report.

The following section describes the portions of the TSCA rules that are relevant to discussions on importing and exporting PCBs for disposal. It begins with a general discussion of TSCA, followed by a discussion of the import/export rules, and culminates with a discussion of the storage and disposal options, including notification and manifesting.

Regulations governing the use, management, and disposal of PCBs in the United States are likely to change in the near future. In December 1994, the EPA issued its first comprehensive modifications of the PCB regulations in 16 years. In a process that began with an Advance Notice of Proposed Rulemaking in 1991, the proposed amendments make changes to the allowable disposal standards and methods, the extent and regulatory requirements for classes of PCB items that fall under the TSCA regulatory framework, including items not specifically regulated under the current rules, and the process for importing and exporting PCBs for disposal.[3]

The EPA anticipates that the proposed revisions will potentially save industry between $4 and $5 billion annually.[4] Public comment on the proposed rule closed in mid-May after the EPA received close to 300 comments. The EPA held a public hearing in early June, and is now considering potential changes for a final rule. No firm deadline exists for promulgating a final rule.[5]

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[2] §6(e) Toxic Substances Control Act, 15 U.S.C.A. §2605(e)

[3] 59 FR 62788- 62877, December 6, 1994.

[4] See letter from Lynn Goldman, March 10, 1995.

[5] The EPA's March 1996 PCB Import Rule no longer requires a regulatory exemption or case-by-case approval by the EPA for imports of PCBs in concentrations greater than 50 ppm if certain conditions are met. However, the Canadian Minister of the Environment signed an Interim Order under the Canadian Environmental Protection Act (CEPA) to ban the export of PCB waste to the United States. The future of the Interim Order is uncertain.

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A. TSCA Regulatory Structure

TSCA imposes strict restrictions on the manufacture, distribution in commerce, sale, use, disposal, and import and export and of PCBs in the United States, based on the statutory presumption that PCBs pose an unreasonable risk to human health and the environment. PCB-related activities may only occur if the EPA has determined specifically that such activities do not pose an unreasonable risk. TSCA regulations are codified at 40 CFR 761. **Appendix A** includes the table of contents for these rules.

PCB regulations cover three broad areas:

(1) How PCBs may be used, processed, distributed, manufactured, exported, and/or imported;

(2) Storage and disposal options and requirements; and

(3) Recordkeeping and reporting requirements.

1. Allowed Uses of PCBs

TSCA bans the manufacture, processing, or distribution of PCBs in the United States unless a use or activity fits into a specific category of allowable uses. The definition of "manufacture" includes importation of PCBs.[6]

Allowed uses fall into the following categories:
(a) totally enclosed activities;
(b) authorized uses; or
(c) exemptions obtained through a petition process.

In addition to these three categories, several other activities are allowed, provided that the PCB concentration falls below the regulatory concentration limit:
(a) inadvertent generation of PCBs;
(b) use or processing of excluded products;
(c) use or processing of recycled PCBs; and
(d) applying sewage sludge that contains less than 50 ppm PCBs.

The EPA has determined that all of these allowed uses and activities pose no unreasonable risk to human health or the environment.

Totally Enclosed Activities. "Totally enclosed" activities are defined as activities that result in "no exposure to humans or the environment."[7] For example, the distribution in commerce of certain intact, non-leaking electrical equipment is considered a totally enclosed activity.

Authorized Uses. "Authorized uses" are non-totally enclosed uses that the EPA authorizes specifically by rule.[8] Authorized uses are based on an EPA finding that the use will not pose an unreasonable risk of injury to human health or the environment. The EPA may modify the list of authorized uses as appropriate.

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[6] TSCA §3(7).

[7] 40 CFR 761.20.

[8] TSCA §6(e)(2)(B)), and 40 CFR 761.30.

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Transformers and capacitors, the largest reservoirs of liquid and high concentration solid PCBs still in use, are specifically authorized uses of PCBs. All phaseout dates for these items have already passed. There are no remaining deadlines for phasing out PCBs currently in use. Transformers and capacitors that contain PCBs face strict requirements on the allowed locations of these items, as well as recordkeeping, monitoring, marking and disposal.

Exemptions. The EPA may grant "exemptions" for activities that are not considered totally enclosed activities or are not specifically authorized by rule.[9] Individuals petition the EPA to approve a one-year exemption for a specific use. Import and export requests are currently considered under the exemption process.

The EPA may grant an exemption with specific terms and conditions based on a two-pronged test:[10]

(1) the activity will not result in an unreasonable risk of injury to health or the environment, and

(2) the applicant has made good faith efforts to develop a substitute that does not represent an unreasonable risk of injury to health or the environment.[11]

Exemptions granted before 1994 renew automatically as long as no changes have occurred in the exempted activity. For exemptions granted after April 1994, petitioners must submit a certified letter to the EPA at least six months prior to the expiration date of their exemption stating that the specific types of PCB activities have not changed. Any changes to an original exemption are considered a new petition for an exemption.

Table 1 summarizes the different types of allowable PCB uses. **Appendix B** lists the specific activities allowed under each category.

[9] TSCA §6(e)(3)(B).

[10] TSCA §6(e)(3)(B).

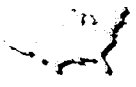
[11] For import for disposal, the EPA has taken the position that the petitioner must show why such activity must occur in the United States, and what steps will be taken to eliminate that need in the future. 59 FR 62877.

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Table 1: Categories of PCB Use/Activities Allowed Under TSCA

	Definition	Comments
"Totally Enclosed" Use	"ensures that exposure of human beings or the environment to PCBs as a result of the activity will be insignificant" (TSCA §6(e))	Definition applies to distribution in commerce of intact, non-leaking electrical equipment such as transformers, capacitors, electromagnets, voltage regulators, switches, circuit breakers, etc. (40 CFR 761.20)
Authorized Use	Activities specifically authorized, based on finding that they will not present an "unreasonable risk" (40 CFR 761.30).	The largest categories of remaining liquid and high concentration solid PCB use fall in this category (e.g., transformers and capacitors). Each has a list of conditions required for compliance (see Appendix B.)
Exemptions	Granted by petition approval process; based on showing of no unreasonable risk and good faith effort to develop substitute; granted for one year with opportunities for renewal. §6(e)(3)(B)	Exemptions may change over time. Some have automatic renewals, others change annually.
Inadvertent Generation	By-product of an excluded manufacturing process (must meet five-part definition to qualify)	Processes allowed, but subject to certification, recordkeeping, and reporting requirements; limits on PCB concentration in product, and air/water releases.
Excluded Products	No special authorization required for use of PCBs with less than 50 ppm.	
Recycled PCBs	PCBs used in the processing of paper products or asphalt roofing materials.	Limits on PCB concentration in product and air/water releases.

Under TSCA, PCBs may be used, manufactured, distributed, processed and/or imported or exported if the activity fits into one of the categories below. Each allowable activity has its own set of conditions that limit use and disposal options, and includes a wide range of requirements such as marking, registration, notification, etc. See **Appendix B** for a full list of allowed PCB uses.



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2. Regulatory Concentration Levels

TSCA rules rely on a concentration-based hierarchy to determine the types of uses allowed, and the specific conditions for use, disposal, and other activities. Regulatory burdens and management requirements increase at higher levels of PCB concentration. Regulations define the procedures for reclassifying equipment to a lower PCB concentration level. PCB concentrations may not be diluted to meet a lower concentration level.

Items that contain PCBs are classified into the following categories:

Non-PCB Items. PCBs in concentrations <50 ppm are generally considered to be "non-PCB items". With the exception of restrictions on using and burning waste oil, these items are not regulated.[12] PCB concentrations in heat transfer and hydraulic equipment must < 50 ppm.

PCB-contaminated electrical equipment. Electrical equipment that contains PCBs in concentrations between 50-500 ppm is known as "PCB-contaminated" electrical equipment. These items have recordkeeping and disposal requirements, along with specifications for storage, cleanup, and notification.

PCB-transformers. Transformers that contain PCBs in concentrations > 500 ppm are known as "PCB-transformers". These items have the most stringent restrictions, including requirements for marking, recordkeeping, inspection, cleanup, registration, notification, location, as well as limited disposal options.

B. Import/Export

PCB imports into the United States are regulated through the term "manufacture," which TSCA defines as "to import into the customs territory of the United States..., produce, or manufacture."[13] Because the manufacture of PCBs is prohibited by statute except in specified circumstances, imports are prohibited as well.

The EPA temporarily allowed the import and export of PCBs for disposal in its "Open Border Policy" in 1979. However, these regulations expired in 1980[14] in order to encourage other countries to develop their own PCB disposal capacity.

1. Current Import/Export Rules

The current rules for PCB import and export for disposal were issued in 1984. Under these rules, only PCBs at concentrations less than 50 ppm may be imported or exported for disposal.[15] Because the EPA has not authorized higher concentrations of PCBs to be imported or exported for disposal, import and export requests are handled on a case-by-case basis through the exemption procedure described above.[16]

[12] 40 CFR 761.20(d) and (e).

[13] TSCA §3(7).

[14] 45 FR 29115.

[15] 40 CFR 761.20(b) and 761.60(h).

[16] TSCA §6(e)(3).

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To date, the EPA has not approved any petitions to import or export PCBs for disposal. Most recently, the EPA proposed to deny four petitions by S.D. Myers to import large volumes of PCB waste from Canada for disposal in the United States. S.D. Myers specifically requested five-year exemptions to import from Canada unlimited quantities of:

(1) Drained PCB transformers that would be disposed of at Myers' facility in Tallmadge, Ohio;

(2) Intact, non-leaking PCB capacitors, which would be processed at Myers' facility, with PCB waste incinerated;

(3) Askarel liquids 500 ppm and over, which would be transported to a TSCA-approved incinerator for disposal; and

(4) Intact, non-leaking PCB-containing fluorescent light ballasts which would be processed to recover reclaimable metals, with contaminated materials shipped off site to a TSCA-approved incinerator.

The EPA proposed to deny these petitions because it determined that Myers had failed the two-pronged test for granting an exemption, namely that its activities would not pose an unreasonable risk and that it had made good faith efforts to investigate and develop alternatives to import.[17] **Appendix C** includes the full text of the EPA's reasons for denying these petitions. In denying these petitions, the EPA also recognized that:

> *. . . opening the border to allow import for disposal may have far-reaching consequences and that it is preferable to raise the issue of the transboundary movement of PCB waste generally in the proposed disposal rules rather than to examine it in isolation in the context of individual company's petitions for exemption.*[18]

2. Proposed Changes to Import/ Export Rules

As part of the PCB disposal amendments issued in December 1994, the EPA proposed to change the process for granting requests to import or export PCBs for disposal. The EPA also asked for comments on retaining the current closed border rules or opening the border generally to import.

In the proposed rules, the EPA retained the general prohibitions on import and export of PCB wastes at concentrations of 50 ppm or greater. However, the proposed rules provide certain exceptions to that ban and alter the requirements for obtaining approval for specific import or export petition requests.

The EPA's proposed modifications to import and export for disposal take two forms. First, the EPA would amend §761.20(b)(2) and §761.20(b)(3) to create categorical exceptions to the general ban on import for disposal of PCBs greater than 50 ppm. Second,

[17] See 59 FR 62879, December 1994 and EPA Docket #66019.

[18] 59 FR 62879.

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the EPA would establish a case-by-case petition procedure under §761.20(b)(4) and (c)(3) for imports and exports for disposal only. Relevant sections of the preamble to these new rules, as well as proposed new regulatory language for importing and exporting PCBs for disposal are included as **Appendix D.**

a. *Imports*

For importing PCBs into the United States for disposal, the EPA proposes three exceptions to the general ban on imports for disposal:[19]

1. *Imports of PCBs at concentrations less than 50 ppm.* These imports would still be allowed (no change from existing rule).

2. *Imports of PCB wastes from U.S. territories or possessions that are outside the customs territory of the U.S.* The proposed changes would clarify definitional differences between the TSCA definition of "United States" which includes territories and possessions, and the Tariff Schedules, which does not include such territories and possessions within its definition of the "customs territory of the United States." Within this clarification, PCBs from U.S. territories or possessions that are outside the customs territory of the U.S. could be transferred into the customs territory of the U.S. for disposal.

3. *Imports of PCBs for disposal where the EPA determines that it is "in the interests of the United States" and will not result in unreasonable risks to health or the environment.* This exception is the major change in the proposed rules for importing PCBs for disposal. It changes the process for obtaining permission to import PCBs for disposal from a rule-making process under TSCA (subject to public notice and comment) to a decision by the Director of the Chemical Management Division without a separate rule-making procedure.

Under the proposed rule, imports for disposal would be allowed on a case-by-case basis and could occur at the EPA's initiative or in response to a petition.[20] The EPA could grant the petition subject to a new two-pronged test:[21]

- the petition is demonstrably in "interest of the United States"; and
- the import for disposal would not result in unreasonable risk of injury to health or the environment.

These rules replace the current "good faith effort" test with a new test of "interest of the United States." The EPA does not define "interests of the United States," but does provide examples, which include United States obligations under a treaty or other international agreement, but not solely because disposal in the U.S. was less expensive.

Facilities that received imported wastes would also be required to meet specific conditions in their TSCA PCB disposal approval to ensure that the

[19] These modifications would change §761.20(b)

[20] 40 CFR 761.20(b)(4).

[21] Proposed 40 CFR 761.20(b)(2)(iii).

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imports did not present an unreasonable risk of injury to health or the environment.

b. *Exports*

The proposed rules would modify the current ban on exports[22] to allow exports for disposal of PCB waste at concentrations of 50 ppm or greater on a case-by-case basis to countries where the receiving country has an international agreement for transboundary disposal of PCBs, unless the the EPA believed that the PCBs would not be properly managed in that country.[23] In the proposed rule, the EPA stated that

> *...the export of PCBs to other countries needs to be limited so as not to pose a risk of injury to health or the environment in those countries and that to the maximum extent practicable, each nation should manage its own waste within its own borders.*[24]

c. *Transboundary shipments not considered import or export*

The EPA defined two types of movements of PCB wastes across national borders that would not considered import or export. PCB wastes generated in the United States may be transported through a foreign country and returned to the United States for disposal. PCBs procured domestically by the U.S. government, taken overseas for use by the U.S. government, and remaining in U.S. government control may be returned to the United States for disposal.

Figure 1 summarizes the proposed import/export rule changes.

C. Storage and Disposal Regulations

The EPA has developed standards for commercial facilities that store and/or dispose of PCBs at concentrations ≥ 50 ppm. The notification and manifesting rule, which took effect in February 1990, allowed the EPA to track PCB wastes in a manner similar to RCRA waste disposal tracking.[25] Storage and disposal facilities must track and report all PCB wastes received.

Information compiled in the annual reports reveals the total volume of PCBs disposed annually, but does not indicate the concentration of that waste or the source (generator) of the waste.

1. Commercial Storage

All commercial storage facilities must obtain EPA approval.[26] Commer-cial storage facilities store PCB wastes generated or owned by other companies. Facilities in existence in 1989 when the notification and manifesting rule was promulgated operate under interim status until the

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[22] 40 CFR 761.20(c)(3).

[23] Proposed 40 CFR 761.20(b)(5)(ii) and 40 CFR 761.20(c)(3)(ii).

[24] 59 FR 62817.

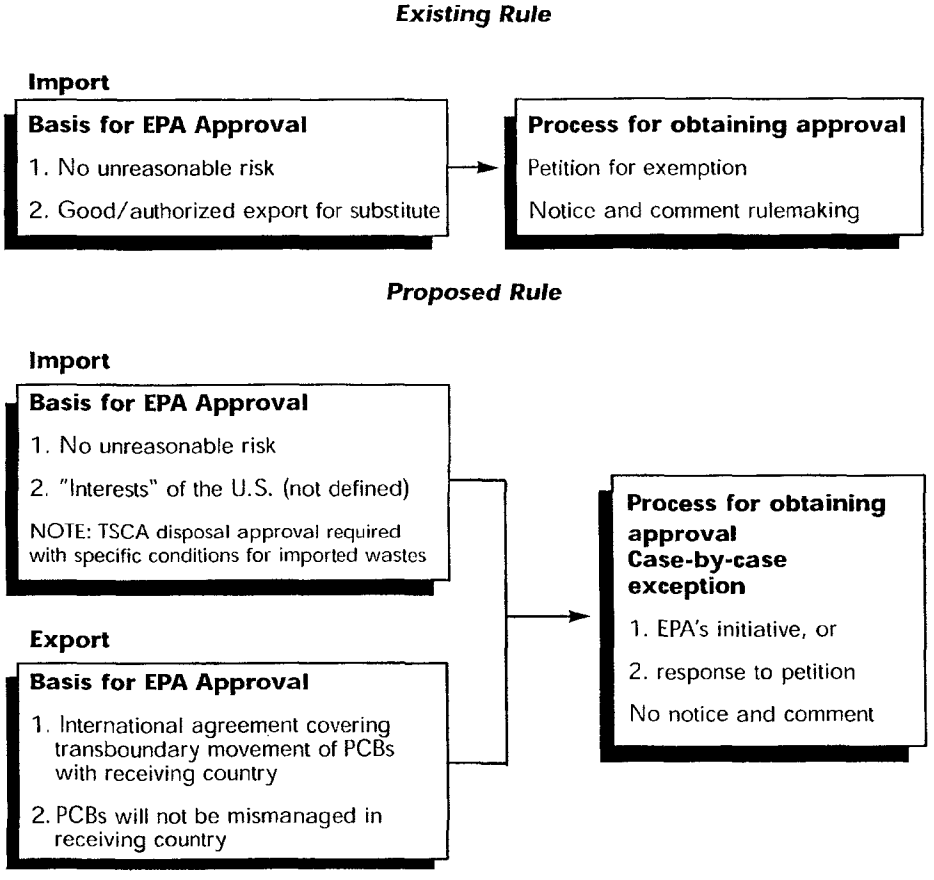
[25] *See* Notification and Manifesting rule, which took effect in February 1990. 54 FR 52716.

[26] 40CFR761.65.

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EPA reaches a final decision on permit status. PCBs at concentrations 50 ppm or greater that are stored for disposal must be stored in facilities that comply with the requirements in 40 CFR 761.65. These facilities must comply with the general facility standards described in 40 CFR 761.65(a),(b), and (c), approval requirements in 40 CFR 761.65(d), recordkeeping requirements of 761.180, as well as tracking requirements. Facilities that store less than 500 gallons of PCBs at any time do not require approval, but must notify the EPA if they are commercially storing PCB wastes.[27] Generators that store their own waste are, for the most part, not required to seek approval as a commercial storer.

Figure 1: Proposed Import/Export Rule Changes



[27] Five hundred gallons is approximately equal to two transformers or ten 55 gallon drums. 54 FR 52719.

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Facilities that store waste from "related" companies such as parent companies or subsidiaries are not considered commercial storage facilities. Commercial storage facilities must also demonstrate financial assurance to account for PCB inventories on site at closure. The closure plans indicate the maximum amount of PCBs that the facility could store on site at any given time.

PCB articles or containers must be disposed of within one year from the date first placed into storage.[28] Only small, non-leaking PCB capacitors (e.g., fluorescent lamp ballasts) and hydraulic machines are exempt from this requirement.[29] The one-year clock begins when the item such as a transformer, is taken out of service and designated for disposal. However, the EPA learned of several instances where PCB articles removed from service were not designated for disposal, but instead intended for "reuse" to avoid compliance with the one-year storage limitation. The EPA's proposed rules would modify the requirements for storage to eliminate this "storage for reuse."[30] For PCBs imported or entering the U.S., the one-year clock begins when the PCBs enter the United States.

2. Disposal

TSCA rules specify allowable disposal methods for PCBs and items that contain PCBs. The disposal options vary by the type of PCB item, the concentration of PCBs, and the pollutant form. PCBs wastes imported for disposal would be subject to the same disposal limitations as wastes that originated in the United States. Disposal of PCBs at concentrations below 50 ppm is generally not regulated. Intact, non-leaking small capacitors and drained PCB-contaminated equipment are not subject to specific disposal requirements.

Disposal options include:

- incineration in a regulated PCB incinerator;
- disposal at a licensed chemical waste landfill;
- disposal in a high efficiency boiler;
- alternative disposal methods subject to EPA approval;
- disposal as municipal solid waste; and
- unregulated disposal.

Table 2 indicates the disposal options available for different PCB items. The disposal company must provide a Certificate of Disposal to the generator of the PCB waste, documenting that disposal occurred within one year after the item was placed in storage. Even where incineration is not required, generators may choose incineration because it destroys the PCBs and eliminates the risk of future liability that may result from landfill disposal.

In the proposed disposal rules, the EPA is seeking to provide additional disposal alternatives for several types of PCB wastes. For example, the EPA is considering several self-implementing disposal options for large volume PCB

[28] 40 CFR 761.65(a).

[29] 40 CFR 761.60(b)(6).

[30] See 59 FR 62721.

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wastes (e.g., dredged materials, contaminated media, etc.) that would not require prior approval from the EPA.[31]

The EPA is also considering adding disposal requirements for currently unregulated items. For example, the EPA has proposed disposal regulations for fluorescent light ballasts based on the belief that the unregulated disposal of large quantities of these items presents an environmental risk.[32] As long as these small capacitors are not leaking, they are not currently regulated under TSCA. In the proposed rule, the EPA has suggested limiting to 25 the maximum number of small capacitors that could be disposed of as municipal solid waste.[33]

Table 2: Summary of PCB Disposal Requirements §761.60

	Incinerator (complies with §761.70)	Chemical Waste Landfill (complies with §761.75)	High Efficiency Boiler	Alternative Method (complies with §761.60(e))	Municipal Solid Waste	Other
PCBs ≥ 50 ppm except mineral oil dielectric fluid, liquid 50-500 ppm, contaminated debris and material ≥ 50 ppm, dredged materials	X	NO	NO	X	NO	
Mineral oil dielectric fluid 50-500 ppm	X	X	X	X (process that destroys PCBs as efficiently as high efficiency boiler or incinerator)	NO	
Liquids other than mineral oil dielectric fluid	X	X	X (prior approval from EPA)	X (process that detroys PCBs as efficiently as high efficiency boiler or incinerator)	NO	
Non-Liquid PCBs ≥ 50 ppm in contaminated soil, rags, or other debris	X	X	NO	X (biological, physical separation)	NO	
Dredged materials and municipal sewage treatment sludges ≥ 50 ppm	X	X	NO	X (approved by Regional EPA in Region where PCBs located)	NO	

continued

[31] *See* 59 FR 62788- 62887 for a full list of proposed changes.

[32] 59 FR 62808.

[33] 59 FR 62813, 62814.

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Table 2 continued

	Incinerator (complies with §761.70)	Chemical Waste Landfill (complies with §761.75)	High Efficiency Boiler	Alternative Method (complies with §761.60(e))	Municipal Solid Waste	Other
PCB articles						
• transformer	X	X (drained of free flowing liquid)	NO	X	NO	
• small capacitors (non-leaking)	OK	OK (subject to container requirements)	OK	OK	OK (unless owned by manufacturer of PCB equipment)	
• large high or low voltage capacitor ≥ 500 ppm	X	NO (landfill disposal ended 1981)	NO	X	NO	
• capacitors 50-500 ppm	X	X	NO	X	NO	
• PCB hydraulic machines ≥ 50 ppm (PCBs ≥1000ppm must be flushed prior to disposal)	OK	OK	OK	OK	OK (drained of free-flowing liquids)	salvage allowed (drained of free-flowing liquids)
• PCB contaminated electric equipment (except capacitors) (drain free-flowing liquid)	OK	OK	OK	OK	OK	not regulated (drained equip. may go to smelter to reclaim metals)
Other ≥ 500 ppm	X	X (drained of free-flowing liquid)	NO	X	NO	
Other 50-500 ppm (drained of free-flowing liquid)	OK	OK	OK	OK	OK	not regulated
PCB containers (packaging that contains PCBs or PCB articles whose surface has been in direct contact with PCBs)						
≥ 500 ppm (unless decontaminated per §761.79)	X	X (drained of liquids)	NO	X	NO	
< 500 ppm	OK	OK	NO	OK	X (drain liquids)	

Key: X = required disposal option (specified by rule). OK = allowed disposal option (not specified by rule).
NO = disposal option not allowed.

Alternative: Must achieve equivalent level of performance as incinerator or high efficiency boilers.

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D. Other Requirements

1. Marking and Recordkeeping

To identify and track PCBs, TSCA rules impose marking and recordkeeping requirements on items that contain PCBs. Table 3 summarizes these marking and recordkeeping requirements, including the changes that the EPA has proposed in the new rules.

Handlers of PCB waste must use a manifest system for tracking waste. All generators of PCB wastes at concentrations ≥ 50 ppm must manifest their wastes using the Uniform Hazardous Waste Manifest.

2. Transportation

The Department of Transportation currently requires specialized containers for packaging and transporting liquid and non-liquid PCBs.[34] The EPA is reviewing these container requirements as part of the PCB disposal amendments. Vehicles that carry liquid PCBs must also be marked.

3. Spill Cleanup

The TSCA spill cleanup policy applies to PCB releases after 1987. The level of cleanup depends on the type and location of the spill.[35] Notification requirements apply when the spill exceeds 10 pounds.

CERCLA also imposes reporting requirements for PCBs.[36] In the proposed PCB rules, the EPA suggested lowering the reportable quantity of the TSCA spill cleanup policy to one pound (from 10 pounds) to be consistent with the CERCLA reportable quantity.[37]

[34] 49 CFR 178.

[35] 40 CFR 761.120, 125.

[36] 40 CFR 302.6.

[37] 59 FR 62821.

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Table 3. PCB Marking and Recordkeeping Requirements
(existing requirements and proposed changes)

Regulated items	Existing marking requirements	Existing in-service records	Existing disposal and storage-for-disposal records	Proposed changes
PCB Containers	ML* on item, ML on transport vehicle if carrying 45 kg or more liquid PCBs	Total kg weight of all containers, description of contents	Date container, serial or I.D. number, kg weight of each, description of contents, dates of removal; transport; and disposal, total number & kg weight	Mark transport vehicle carrying over 45 kg liquid or solids
PCB Article Containers	ML on item	Total kg weight of all containers, description of contents	Serial or I.D. number, kg weight of each, description of contents, dates of removal; transport; and disposal, total number & kg weight	Date article container
PCB Transformers	ML on item, ML on access to unit (doors, etc.), ML on transport vehicle	Total number of units, total kg weight, inspection & maintenance records	Date article, serial or I.D. number, kg of fluid in each, dates of removal; transport; and disposal, total number & kg weight	Record of sale, record of in-service registration with the EPA
PCB Large High Voltage (LHV)	ML on unit or on protected location	Total number (protected location records if applicable)	Date article, serial or I.D. number, kg of fluid in each, dates of removal; transport; and disposal, total number & kg weight	Record of sale
PCB Large Low Voltage (LLV) Capacitors	ML on item when removed from use[1]	Total number	Date article, serial or I.D. number, kg of fluid in each, dates of removal; transport; and disposal, total number & kg weight	Record of sale, in-service marking
PCB Small Capacitors	(1)			
PCB Contaminated Electrical Equipment	Not required	Not required	Not required (once drained)	Record of sale
PCB Equipment that contains Large High Voltage (LHV) Capacitors or transformers	ML on item when removed from use or distributed in commerce	Records required for LHV Capacitors or transformers	Records required for LHV Capacitors or transformers	In-service marking, record of sale

continued

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Table 3 continued

Regulated items	Existing marking requirements	Existing in-service records	Existing disposal and storage-for-disposal records	Proposed changes
Natural Gas Pipelines & Compressors (≥ 2 ppm)	ML on item			Appurtenances & air compressor systems added to definition
Bulk PCB waste	ML on container		kg weight/quantity & dates of each batch in or out. Also disposition of each batch out, total kg weight	
Storage areas	ML on area		Annual records as required under §761.180	Maintain inventory on site, records of inspections, generators must also file Annual Reports, records of attempts to dispose of within 1-year
Transport vehicles	ML on vehicle if contains PCB transformer(s) or 45 kg or more liquid PCBs		Marking also required if carrying 45 kg or more solid PCBs	
Access to PCB Transformer	ML or approved mark			
PCB motors, hydraulic and heat-transfer systems[2]	ML on item			Record of sale
Pre-TSCA Uses				ML in facility, records of historical use, air monitoring, & wipe sampling

Source: 59 FR 62839, December 6, 1994

*ML= Large PCB Label (Mark, Large)
1. Manufacturers are required to mark non-PCB Large Low Voltage capacitors, small capacitors, and fluorescent light ballasts with a "No PCBs" label until 7/11/98.
2. The use of these PCB items is no longer authorized.

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Monsanto Company was the sole manufacturer of PCBs in the United States, producing 700,000 tons (1.4 billion pounds) of pure PCBs from 1929 - 1977. Annual PCB sales peaked at 85 million pounds in 1970. The majority of PCBs were used in the production of dielectric fluids for transformers, capacitors, and other electrical components. PCBs were also used in synthetic resins, epoxy paints and protective coatings, and hydraulic and heat transfer fluids. While none of these items are currently manufactured with PCBs, electrical equipment such as transformers, capacitors, fluorescent lamp ballasts, and many other products manufactured before PCBs were banned still remain in service. This section discusses PCB inventory and disposal data that is available in the United States, including the limitations to this data.

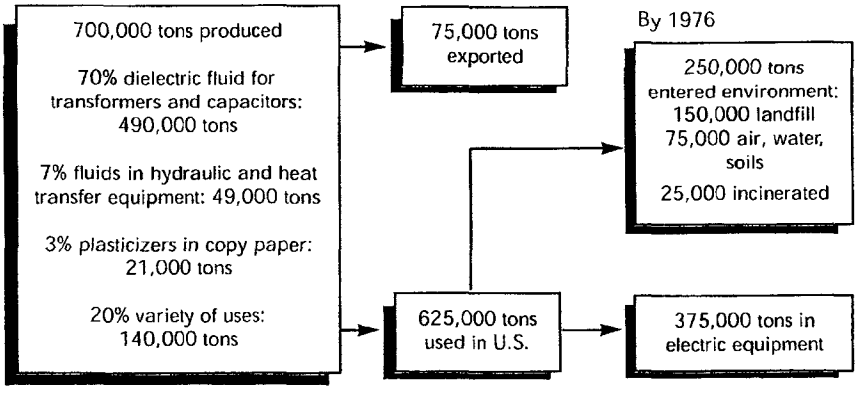
A. PCB INVENTORY IN THE UNITED STATES

When the EPA first began to regulate PCBs in the 1970s, it estimated the fate of the PCBs produced by Monsanto. The following chart depicts those estimates.

Due to the widespread uses of PCBs, it is difficult to develop a comprehensive inventory of remaining PCBs. Two types of inventories are relevant to understanding the quantity of PCBs in the United States that may require disposal: (1) PCBs remaining in use that will eventually need disposal, and (2) remediation and other large volume wastes that require treatment and disposal. This section summarizes the information that the EPA uses to estimate remaining quantities of PCBs.

1. PCBs Remaining in Use

The last inventory of PCBs remaining in service in the United States was conducted for the Electric Power Research Institute (EPRI) in 1988.[38] This report updated a comprehensive 1982 inventory which was based on a survey of the 100 largest electric utilities. However, the 1988 report did not conduct new survey data or any surveys to develop non-utility equipment data. The report used utility



[38] Resource Planning Corporation, *Appendix A: Estimated 1988 PCB Equipment Inventory (Final Report)*, October 1988.



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information to extrapolate non-utility data, based on the assumption that utilities owned 30 percent of the askarel transformers, 80 percent of the mineral oil transformers, and 85 percent of the large PCB capacitors. Although the 1988 report is not as extensive or exhaustive as the 1982 report, it is considered the best available inventory of PCBs in use in the United States.

The 1988 report modified some of the numbers used in the original 1982 report, and estimated a 1988 inventory of electrical equipment containing PCBs and the amount of PCBs remaining in use. The study did not include fluorescent lamp ballasts. Table 4 shows how the inventory numbers compare between studies.

Table 4: PCB Inventory in the United States (1988)

Equipment Type	Total Units	50-500 ppm	>500 ppm	Total lbs. PCBs
Askarel Transformers	1982 (EPA): 132,000	0	132,000	249,000,000
	1982 (RPC): 132,000	0	132,000	249,000,000
	1988: 74,300	**0**	**74,300**	**121,000,000**
Mineral Oil	1982 (EPA): 25,300,000	2,710,000	275,000	328,000
Transformers	1982 (RPC): 28,100,000	3,010,000	305,000	364,000
	1988: 26,440,000	**2,596,000**	**263,700**	**314,000**
Large PCB	1982 (EPA): 3,290,000	0	3,290,0003	103,000,000
Capacitors	1982 (RPC): 3,290,000	0	290,000	103,000,000
	1988: 1,460,000	**0**	**1,460,000**	**45,500,000**
		Total 1988		**166,814,000**

Large quantities of electrical equipment containing PCBs have been disposed of since this inventory. However, because disposal data, described below, does not track the source or concentration of the wastes, it is difficult to estimate a 1995 inventory based on these numbers.

2. Large Volume PCB Wastes

Large volume PCB wastes — dredged materials, contaminated environmental media, sewage treatment sludges, demolition wastes and other items generated or managed in greater volumes than when they were originally placed in service — must be disposed of in commercially permitted PCB disposal facilities. In 1991, the EPA estimated that 20 percent of the

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National Priorities List (NPL) sites under Superfund, and seven percent of the CERCLIS sites had PCBs as the "predominant" waste. Approximately 34,070,000 cubic yards of material at the NPL sites are contaminated with PCBs.[39]

Currently, large volume wastes must be disposed of based on the original concentration of the material. In the proposed rules, the EPA is proposing to allow additional disposal options and standards for these wastes. The types of disposal options available for this material would affect the capacity available to handle these wastes.

B. PCB Storage and Disposal Facilities

All companies that store or dispose of PCBs commercially must have approval from the EPA. Closure plans and disposal permits indicate the maximum available capacity for storing and disposing of PCBs. This section describes the available information for storage and disposal facility locations and capacities.

1. Commercial Storage Facilities

Commercial storage facilities exist in all ten EPA regions. **Appendix E** includes a full list of permitted commercial PCB storage facilities. In many cases, a commercial PCB storage facility is also a permitted PCB disposal company.

Estimates of excess storage capacity are not feasible, as the amount of PCB wastes in storage at any given time fluctuates depending on how quickly the waste moves from storage to disposal. As part of the annual report required under the notification and manifesting rule, commercial storage facilities indicate the amount of PCB waste in storage at the end of each year. Because the 1994 annual reports are not due until July 1995, the most recent data covers 1993.

For illustration purposes, **Figures 2 and 3** show the trends (in number of items and volume of PCB wastes) of capacitors, article containers, transformers, and PCB containers in storage from 1990-1993, the only years for which such data is available. At the end of 1993, 26,000,000 kilograms (57,320,000 pounds) of PCB wastes were in storage, the lowest amount since the EPA began tracking storage volumes in 1990. Conversations with facility managers indicate that there is no shortage of commercial storage capacity in the United States.

[39] 59 FR 62791.

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Figure 2: Numbers of PCB Items in Storage, Beginning and End of Each Year, 1990-1993

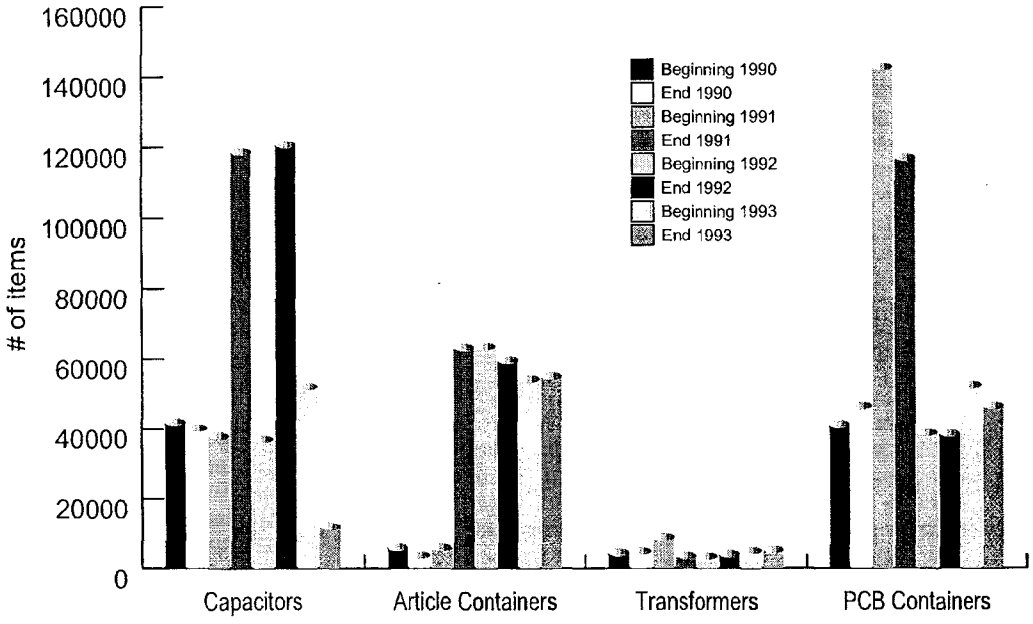
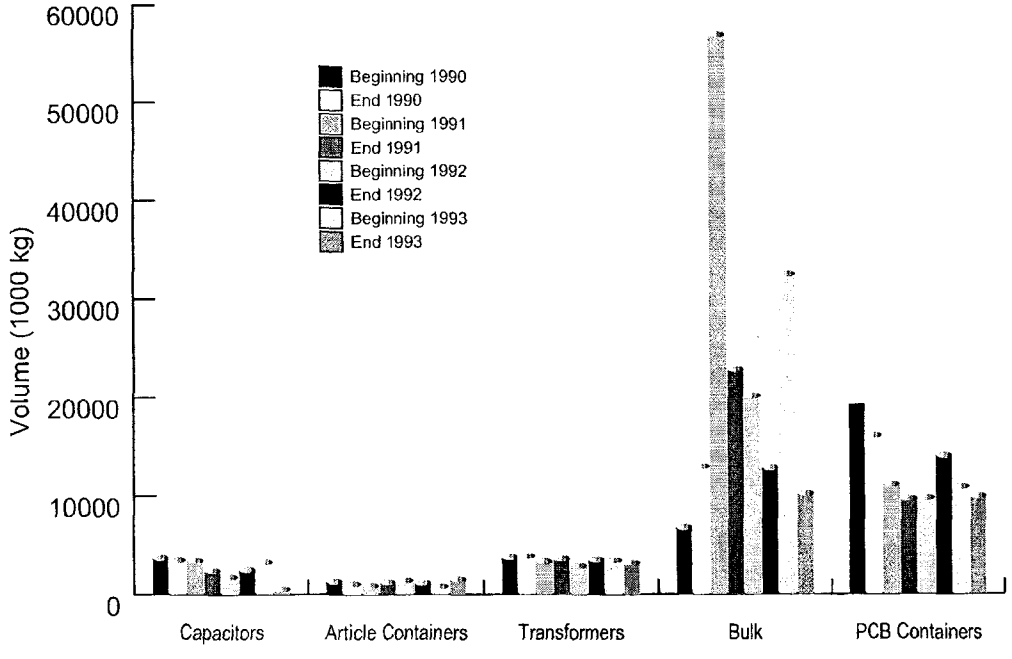


Figure 3: Volumes of PCB Materials in Storage, Beginning and End of Each Year, 1990-1993



Source: 1993 PCB Annual Report Summary

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2. Commercial Disposal Facilities

a. Locations

In the United States, four incinerators are currently permitted to handle PCBs. PCB incinerators are located in Kansas, Utah, and Texas. One mobile incinerator is also in operation. It is scheduled to be in Michigan for the duration of 1995. A new incinerator in Utah is conducting test burns during the summer 1995. In addition to PCB incinerators, there are seven chemical waste landfills, four sites for physical separation, seven sites for chemical dechlorination, three facilities engaged in transformer decommissioning, and three facilities engaged in fluorescent light ballast recycling.

Table 5 show the different companies permitted for each type of disposal option. Table 6 shows the different types of disposal activities each company is permitted to operate. Figure 4 shows how these facilities are distributed throughout the United States. Appendix F includes maps showing the locations for each type of treatment and disposal option.

Table 5: Commercially Permitted PCB Disposal Companies
(by type of disposal)

Disposal Type	City/State
Incinerators	
Aptus, Inc.	Coffeyville, KS
Aptus, Inc.	Aragonite, UT
Chemical Waste Management	Port Arthur, TX
Rollins	Deer Park, TX
Incinerators (mobile)	
Weston	
U.S. Pollution Control, Inc. *(test burn scheduled summer 1995)*	Clive, UT
Chemical Waste Landfills	
Chemical Waste Management	Emelle, AL
Chemical Waste Management	Kettleman City, CA
Chemical Waste Management	Model City, NY
Chemical Waste Management	Arlington, OR
Envirosafe Services Inc. of Idaho	Boise, ID
U.S. Ecology, Inc.	Beatty, NV
U.S. Pollution Control, Inc.	Knolls, UT

continued

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Table 5 continued

Disposal Type	City/State
Physical Separation	
Aptus, Inc.	Coffeyville, KS
Salesco	Phoenix, AZ
S.D. Myers, Inc.	Tallmadge, OH
Unison Transformer Services, Inc.	Henderson, KY
Chemical Dechlorination	
Aptus, Inc.	Coffeyville, KS
ENSR Operations	Canton, OH
Exceltech, Inc.	Fremont, CA
PPM, Inc./Laidlaw	Tucker, GA
PPM, Inc./Laidlaw	Kansas City, MO
PPM, Inc./Laidlaw	Philadelphia, PA
S.D. Myers, Inc.	Tallmadge, OH
Trinity Chemical Company	Mound Valley, KS
PCB Transformer Decommissioning	
Aptus, Inc.	Coffeyville, KS
S.D. Myers, Inc.	Tallmadge, OH
Salesco	Phoenix, AZ
Trans End (Unison)	Ashtabula, OH
Fluorescent Light Ballast Recycling	
FulCircle Ballast Recyclers	Bronx, NY
S.D. Myers, Inc.	Tallmadge, OH
Salesco Systems USA, Inc.	Phoenix, AZ
Alta Light Ballasts (mobile) *(application pending)*	Springfield, VA

Note: Aptus facilities are now owned by Rollins. USPCI and PPM facilities are owned by Laidlaw.

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Table 6: Commercial PCB Disposal Facilities (sorted by region)

Company	Facility Location	Telephone	EPA Region	Disposal Activity Types						
				Incinerators	Chem. Waste Landfills	Chemical Dechlorination	Physical Separation	PCB Trans. Decomm.	Fluor. Ballast Recycling	Biological
FulCircle Ballast Re.	Bronx, NY	(800) 775-1516	II						X	
Chem. Waste Mgmt.	Model City, NY	(716) 754-8231	II		X					
PPM, Inc./Laidlaw	Philadelphia, PA	(215) 425-5144	III			X				
Chem. Waste Mgmt.	Emelle, AL	(205) 652-9721	IV		X					
PPM, Inc./Laidlaw*	Tucker, GA	(404) 934-0902	IV			X				
Unison Transformer	Henderson, KY	(502) 827-0541	IV				X			
ENSR Operations*	Canton, OH	(216) 452-0837	V			X				
SD Myers*	Tallmadge, OH	(800) 444-9580	V			X	X	X	X	
Trans End (Unison)	Ashtabula, OH	(216) 992-8665	V					X		
Chem. Waste Mgmt.	Port Arthur, TX	(409) 736-2821	VI	X						
Detox Industries	Sugar Land, TX	(713) 240-0892	VI							X
Rollins	Deer Park, TX	(713) 930-2300	VI	X						
Aptus, Inc.	Coffeyville, KS	(316) 251-6380	VII	X		X	X	X		
PPM, Inc./Laidlaw	Kansas City, MO	(816) 221-6827	VII			X				
Trinity Chem. Co.	Mound Valley, KS	(316) 328-3222	VII			X				
Aptus, Inc.	Aragonite, UT	(801) 531-4200	VIII	X						
U.S. Pollution Control	Knolls, UT	(801) 595-3900	VIII		X					
U.S. Pollution Control	Clive, UT			X-test burn 1995						

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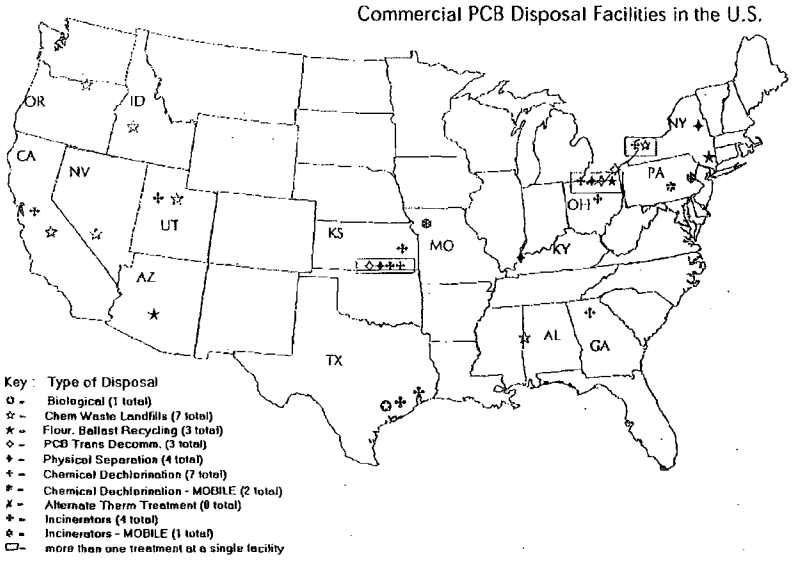
Table 6 continued

Company	Facility Location	Telephone	EPA Region	Disposal Activity Types						
				Incinerators	Chem. Waste Landfills	Chemical Dechlorination	Physical Separation	PCB Trans. Decomm.	Fluor. Ballast Recycling	Biological
Chem. Waste Mgmt.	Kettleman City, CA	(209) 386-9711	IX		X					
Exceltech, Inc.	Fremont, CA	(510) 659-0404	IX			X				
Salesco Systems	Phoenix, AZ	(800) 368-9095	IX				X	X	X	
U.S. Ecology Inc.	Beatty, NV	(702) 553-2203	IX		X					
Chem. Waste Mgmt.	Arlington, OR	(503) 454-2643	X		X					
Envirosafe Services	Grandview, ID	(800) 274-1516	X		X					
Mobile Treatment Facilities (Operating in Region)										
Weston	West Chester, PA	(610) 692-3030	III	X-(MI)						
Alta	Springfield, VA		III						X-application pending	
No longer operating or closing in 1995										
CECOS Int'l Process.	Cincinnati, OH	(513) 724-6114	V				X			
General Electric	Pittsfield, MA	(413) 494-2700	I	(alt. thermal)						
General Electric	Schenectady, NY	(518) 385-2426	II				X			
Trans End	*Kansas City, KS*	(913) 321-3155	VII					X		

*Permitted to operate in all ten EPA regions.

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Figure 4



b. Trends

In the annual reports required under the notification and manifesting rule, commercial disposal companies indicate the quantity of waste disposed of each year. The annual report tracks capacitors, article containers, transformers, PCB containers, and bulk material.[40] It does not indicate the concentrations of PCB wastes or the source of such wastes. Therefore, it is difficult to link the disposal date directly to the 1988 inventory data.

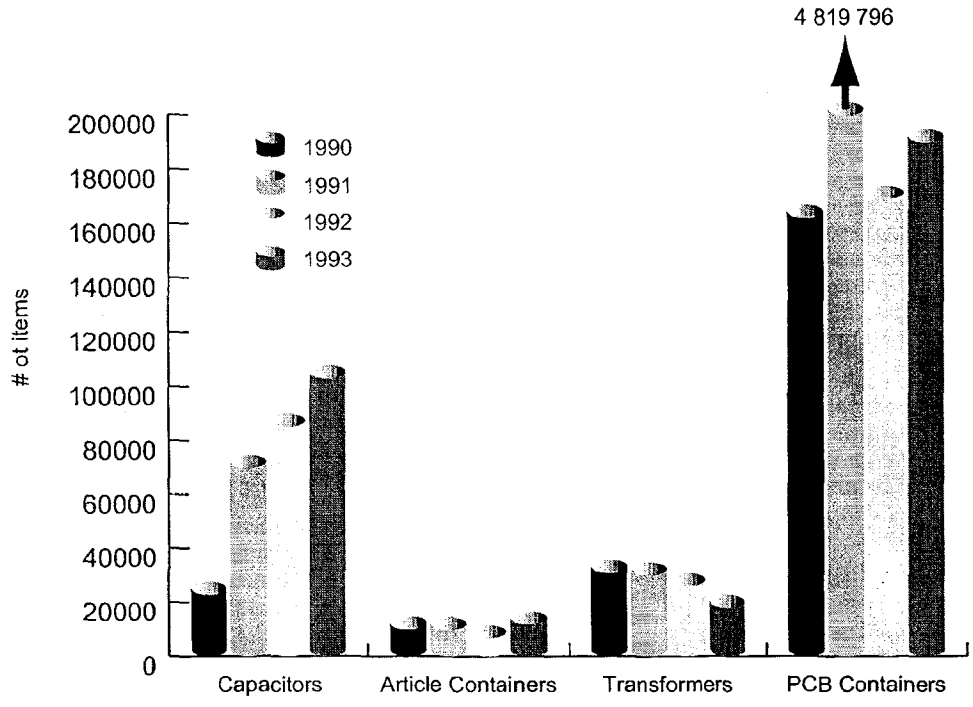
In 1993, 765,500,000 kilograms (1,687,638,617 pounds) of PCB waste was disposed of in TSCA-permitted disposal facilities.[41] This was the largest total amount of waste disposed of since the annual reports began in 1990, and represented an increase of 2.5 percent from 1992. The number of transformers and the volume of PCB waste accounted for in transformers has declined each year. For illustration purposes, **Figures 5, 6a and 6b** show the trends in disposal from 1990-1993, the only years for which such data is available.

[40] "Article containers" have PCB equipment whose surface has not been in direct contact with PCBs; "PCB containers" have PCB equipment whose surface has been in direct contact with PCBs; "bulk material" includes liquids and soils.

[41] 1993 PCB Annual Report data.

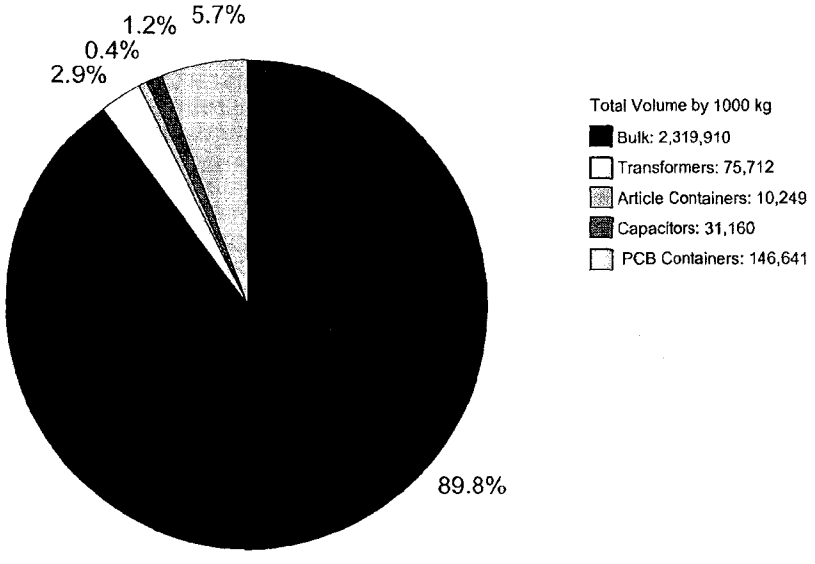
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Figure 5: Numbers of PCB Items Disposed of During 1990-1993



Source: 1993 PCB Annual Report Summary

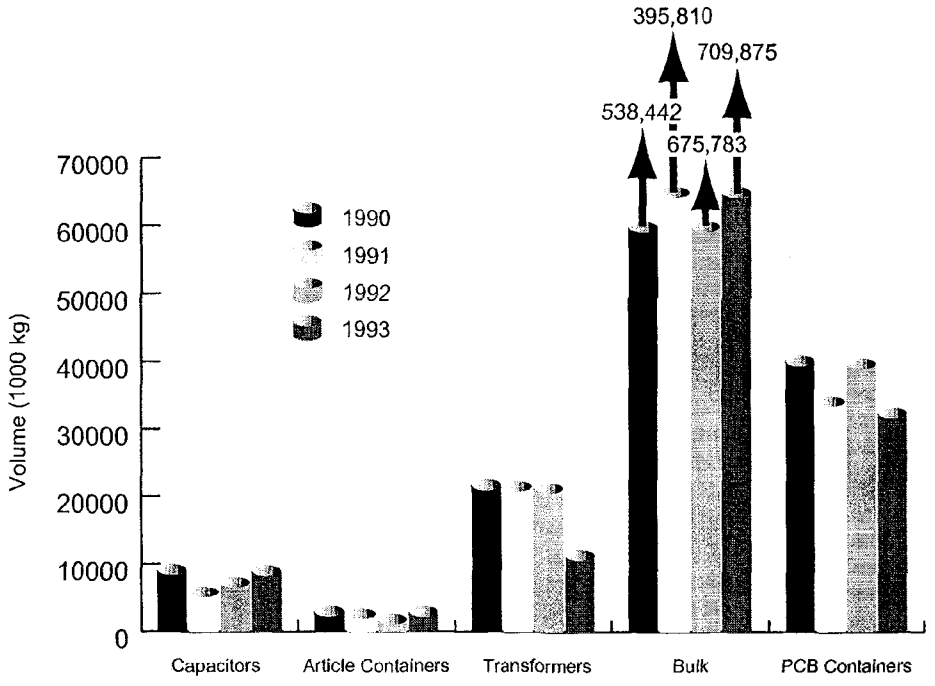
Figure 6a: Total PCB Disposal Volumes, 1990-1993 (by disposal type)



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Figure 6b: PCB Disposal Volumes, 1990-1993

Total volumes 1990-1993 = 5.7 billion lbs. (2.6 billion kg)



Source: 1993 PCB Annual Report Summary

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The following **Table 7** shows total volumes of PCB wastes disposed of in each EPA region in 1993.[42] Regions with chemical waste landfills had the largest volumes of PCB waste disposal.

Table 7: Total Volumes of PCB Wastes Disposed of in Each EPA Region, 1993.

EPA Region	Total kg Disposed of in 1993
I	2,447,000
II	378,311,000
III	17,322,000
IV	8,319,000
V	21,489,000
VI	51,197,000
VII	27,697,000
VIII	89,325,000
IX	101,462,000
X	67,867,000

c. *Capacity*

Estimating unused capacity at each facility is a difficult task. Some facilities have maximum quantities of material delineated in their permits. In some cases, this limit is based on a maximum quantity per year; in others, it is based on a feed rate per hour. Other facilities do not have a specific permit limit, but have a practical maximum amount of material based on their permitted processes.

Ross & Associates contacted the environmental compliance managers at each commercially permitted PCB disposal company to determine whether capacity was available to handle additional PCBs. In almost all cases, facilities were operating below their permitted or maximum practical capacities.

Incinerators. Information was obtained from three of the four operating PCB incinerators. Each incinerator has a specific permit limit for PCBs, expressed in either tons per year or as a feed rate in tons per hour. All PCB incinerators are co-permitted to burn RCRA wastes, so any available "capacity" for PCBs could be allocated to other hazardous wastes if PCB volumes were lower than expected. Two facilities had permit limits expressed as feed rates (e.g., amount of PCBs per hour), and one facility reported permit limits in terms of a maximum amount per year. Therefore, we did not calculate a total quantity for available capacity. By comparing the permitted maximum PCB capacity to the actual reported PCB quantities processed at each facility, it appears that the incinerators are currently

[42] Data Received from PCB Annual Reports: *Highlights of 1993* and *A Comparison to 1990, 1991, and 1992*, U.S. EPA, 1995.

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operating at 57-75 percent of their permitted capacity. The facility that reported capacity in tons per year estimated excess capacity of 5,500 tons/year of PCBs.

Landfills. Information was received from five of the seven landfills permitted to handle PCBs. Landfills report capacity in terms of space remaining in the landfill, which is expressed in cubic yards. Based on reported information, 11,533,192 cubic yards of landfill space was available, and 3,210,000 cubic yards of additional space will become available in the near future. All of the landfills handle RCRA wastes in addition to PCBs, so the available space would be used for PCBs and other hazardous wastes.

Treatment. Facilities involved in chemical dechlorination, physical separation, transformer decommissioning, and fluorescent lamp ballast recycling all perform interim treatment on PCB items to reduce the concentration of PCBs and/or recycle the equipment. These facilities typically do not have maximum quantities specified in their permits. However, they do face practical maximum limits based on their permitted treatment processes. Because some facilities reported information in terms of quantity of PCBs and others in terms of types of equipment, we did not calculate a total capacity or total available capacity for treating transformers, capacitors, lamps, and other PCB items. However, several facilities reported operating at levels between 8-50 percent of the maximum quantity of PCBs or PCB items they could potentially handle.

The Environmental Technology Council (ETC), an association of companies engaged in PCB treatment, reclamation, and disposal of PCBs and hazardous wastes, recently conducted its own survey of excess capacity at United States commercial PCB disposal facilities.

Additional incinerator capacity is currently in the permitting process under RCRA. Although much of this capacity is non-commercial, it will lessen the pressure on existing and future commercial capacity. The PCB Disposal Amendments propose a number of changes for treatment and disposal of large volume wastes and decontamination of liquids and surfaces, which should greatly increase the capacity while reducing disposal costs at commercial facilities.

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IV. INTERNATIONAL AGREEMENTS

Several international agreements address transboundary shipments of hazardous wastes, including PCBs. The goal of these agreements is to promote environmentally sound management of hazardous wastes, including protection of human health and the environment in each country, and to protect against adverse circumstances that may result from mismanagement of improper international movements of hazardous wastes.

This section highlights the primary international agreements that would affect transboundary movement of PCBs in the United States. The relevant agreements include the Basel Convention,[43] the United States/ Canada Bilateral Agreement[44], and the United States/Mexico Bilateral Agreement (also known as the LaPaz Agreement).[45] These agreements would only be applicable if the United States, as a first step, allowed PCBs to be imported or exported for disposal. Because all three countries are members of the Organization for Economic Cooperation and Development (OECD), a pending trade agreement that would ban PCB export between OECD member and non-member countries would not apply to PCB exports between the United States, Canada, and Mexico.

A. BASEL CONVENTION

The Basel Convention, enacted on May 5, 1992, establishes principles for the movement of hazardous wastes across international boundaries. PCBs are specifically identified in Annex I of the Basel Convention as a "waste to be controlled". The primary tenet of the Basel Convention is that countries should be responsible for managing their own hazardous waste. The Convention forbids transfer of hazardous wastes between member and non-member nations, unless a separate bilateral agreement is established between a member and non-member country seeking to export or import wastes.

The United States has signed but not yet ratified the Basel Convention. Therefore, it is not considered a party to Basel. Both Canada and Mexico have ratified the agreement. The U.S. has two bilateral agreements that existed before the Basel Convention — one with Canada, and one with Mexico. As a result of these agreements, transboundary shipments of hazardous wastes between the United States and Canada or the United States and Mexico are allowed under Basel. If these agreements are renegotiated or altered they would likely need to conform to Basel's

[43] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, May 1992.

[44] Agreement Between the Government of Canada and the Government of the United States of America Concerning the Transboundary Movement of Hazardous Waste, 1986.

[45] Annex III to the Agreement Between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area: Agreement of Cooperation Between the United States of America and the United Mexican States Regarding the Transboundary Shipments of Hazardous Wastes and Hazardous Substances.



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stricter standards. Article 11 of Basel provides that bilateral agreements entered into after the date of the Convention "must not derogate from" the environmentally sound management required under Basel.[46]

B. U.S./Canada Bilateral Agreement

The United States and Canada permit conditional transboundary shipment of hazardous wastes based on a 1986 agreement between the two countries. The agreement covers imports, exports, and transit through third party countries. It ensures that the treatment, storage, and disposal of hazardous waste are conducted to reduce risks to public health, property, and environmental quality. Each country defines what wastes are covered under the term "hazardous wastes."

The agreement includes standard notification and consent provisions. The exporting country must notify the importing country of upcoming hazardous waste shipments, and the country receiving the wastes must consent to such shipments. For the U.S./Canada agreement, the importing country has 30 days to reject or accept the planned export. If no objection is received within that time frame, the importing country is considered to have no objection to the shipment. The exporting country notifies all transit countries of waste shipments passing through their territory. The importing country may amend terms of proposed shipments, or withdraw or modify consent already given to the exporting country.

General obligations of the United States and Canada in these arrangements include monitoring and spot checking of transboundary shipments, following manifest rules of both countries, and implementation of regulations needed to comply with the agreement. Exporting countries must also readmit waste from the import country as required.

C. U.S./Mexico Bilateral Agreement

The United States/Mexico bilateral agreement is part of a larger agreement between the U.S. and Mexico for environmental protection in the border area, which refers to the area 100 kilometres on each side of the border. Annex III of this agreement covers the transboundary shipments of hazardous wastes and hazardous substances. The agreement includes notification and consent provisions. Under the U.S./Mexico agreement, the exporting country provides a notification of intent to export hazardous waste to the importing country 45 days in advance of shipment. Consent or objection from the importing country is required in the following 45 day period. Unlike the United States/Canada agreement, no response from the importing country does not imply consent.

The importing country may amend terms of proposed shipments, or withdraw or modify consent already given to the exporting country, and the exporting country must readmit any shipment returned to them by the importing country.

[46] Article 11.

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Table 8 shows how some of the key provisions compare between these U.S./Canada and the U.S./Mexico bilateral agreements. The primary differences involve the timelines and implications of the notification and consent provisions.

The U.S./Mexico agreement includes an additional provision that applies to the *maquiladora* facilities operating in the border region. Article XI specifies that hazardous waste must be readmitted to the country that supplied the raw materials.[47] These wastes are known as "*maquiladora* wastes." EPA Regions 6 and 9 have developed a special database known as HAZTRAKS to track *maquiladora* hazardous wastes. PCB wastes are tracked in this system, identified by the United Nation Waste code(s) for PCBs.[48] The only PCB waste that shows up in this database came from the Defense Reauthorization and Marketing Office (DRMO) in Panama, which indicates that U.S. military bases were the sources of the PCBs.[49]

[47] Article XI, Hazardous Waste Generated From Raw Materials Admitted In-Bond.

[48] These waste codes are 2315 (PCBs), 3151 (liquid PHBs), and 3152 (solids with PHBs).

[49] Note: Only Region 6 and 9 have a computer tracking system for manifested wastes. This database was developed specifically for *maquiladora* wastes, but would pick up other manifested waste in the region.



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Table 8. Summary of the U.S./Canada and U.S./Mexico Bilateral Agreements

	U.S./Canada Agreement	U.S./Mexico Agreement
Purpose of Agreement	Permits export, import and transit of hazardous waste between the countries to ensure that the treatment, storage, and disposal of hazardous waste is conducted to reduce the risks to public health, property, and environmental quality.	
Materials covered restricted	• Hazardous waste (subject to manifest requirement in U.S.)	• Hazardous waste and hazardous substances (banned or severely pesticides and chemicals) Note: Hazardous waste generated from raw materials "admitted in bond" is returned to country of origin.
Export Information	• Notify importing country of transboundary shipments • Covers individual or series of shipments, for up to a year • 30-day response period for consent or objection • No response implies no objection to export	• Notify importing country of transboundary shipments • Covers individual or series of shipments, for up to a year • 45-day response period for consent or objection • If a response is not received, consent is *not implied*
	Both Agreements	
Manifest Information Provided by Exporting Country	• Description of waste • Frequency of shipments • Length of shipment cycle • Estimated total quantity	• Point of entry into country of import • Name and address of transporters, means of transport • Description of how waste will be treated, stored or disposed • Name and site of importer, date of receipt
	Both Agreements	
General Obligations	• Follow manifest requirements of both countries • Implement regulations needed to comply with this agreement • Export country provides necessary documentation to exporters • Protect proprietary information • Monitor and spot check transboundary shipments to insure compliance	• Importing country can amend terms of proposed shipments • Importing country may withdraw or modify consent • Readmit any shipment returned by importing country • Country of import may require insurance for waste
	Amendments require mutual written consent of both countries.	
Length of agreement, renewal, termination and review rules	• Agreement negotiated 11/8/86 • Renewed every five years, unless notice given by one of the countries	• Agreement negotiated in 1983, reviewed every two years • Agreement is indefinite, unless termination is requested by one party

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V. ISSUES RAISED REGARDING OPENING THE U.S. BORDER

As part of the proposed PCB rules, the EPA also requested comment on the circumstances under which the U.S. border should be opened to trans-boundary shipments of PCBs for disposal. According to the EPA,

> *The options range from allowing all imports for disposal under section 6(e) to maintaining the current closed border status, and might include opening the border to PCBs from a limited geographic areas such as the Great Lakes drainage basin.*[50]

The EPA received extensive comments on the import/export provisions of the rules from a wide range of commenters that agreed and disagreed with the EPA's general proposal and recommended additional modifications to govern import and export for disposal. The EPA also held a public hearing in early June for a response to comments. Final rules are likely to be issued by summer 1996.

Most commenters encouraged the EPA to open the U.S. borders to imports, citing available disposal capacity in the U.S. Some referred to insufficient disposal capacity in Canada, whereas others disputed that notion and encouraged PCB imports on a purely free trade argument. However, a coalition of Canadian PCB-disposal companies, represented by an American law firm, presented a detailed legal argument explaining that the EPA does not have authority under TSCA to open the borders to import PCBs for disposal.

Table 9 highlights the primary arguments offered to the EPA in support of or opposing opening the U.S. border to imports for disposal. In addition to arguments for and against opening the border, some commenters expressed a need for third party notification for PCB waste imports based on a poten-tial liability risk for U.S. generators that do business with disposal companies that accept imported PCBs. **Appendix G** includes a list of companies that submitted comments on the EPA's proposed import/export rules.

[50] 59 FR 62816.

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Table 9: Summary of Arguments For and Against Opening the U.S. Border to PCB Disposal

Arguments FOR Opening the Border

- No unreasonable risk of injury to health or environment.
- PCB imports for disposal passed TSCA "no unreasonable risk" standard when the EPA implemented open border policy in 1979 — proper disposal in U.S. protects against improper disposal elsewhere.
- PCB imports would be subject to same disposal requirements as domestic PCBs.
- U.S. has excess disposal capacity to handle imported PCBs.
- Eliminate indefinite PCB storage in Canada and Mexico.
- Free up resources in Canada and Mexico to focus on other environmental problems.
- Most PCBs in North America were manufactured by U.S. companies: distinction between foreign and domestic is irrelevant.
- Large volumes of RCRA hazardous wastes are imported to the U.S.
- U.S. military-owned PCBs are returned to the U.S.
- No new facilities would need to be constructed to manage imported wastes.
- Opening the border would support NAFTA free trade goals. Lower cost for PCB disposal in U.S. would help U.S. companies with subsidiaries in Canada and Mexico and would generally lower cost of PCB disposal.
- Incinerators are permitted to burn a maximum quantity of PCBs.
- Imported PCBs would be only a small percentage of total hazardous waste shipments.

Arguments AGAINST Opening the Border

- The EPA's proposed changes are inconsistent with TSCA requirements.
- Regulatory changes that would allow PCB imports for disposal would not be allowed under TSCA.
- Regulation of imports for disposal must be treated differently than domestic disposal.
- Mexico may not have any incentive to develop its own facilities.
- Exemptions must be granted by rule — the EPA cannot change this procedure.
- No statutory basis for open border policy or geographic initiative.
- Open border policy would undercut Canadian firms that developed PCB disposal capacity in Canada.
- International agreements encourage each country to manage its own waste(s).

Source: EPA docket #66009A: Comments on EPA's proposed PCB disposal rules issued December 6, 1994.

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VI. CONCLUSION

This report summarized the PCB regulations in the United States, as well as available information on PCB storage and disposal facilities and capacities. It is one of three background reports commissioned by CEC to understand the issues involved in a transboundary PCB disposal strategy. Transboundary PCB disposal options are receiving increasing attention, and options for PCB disposal in North America are changing rapidly. Within 1995 alone, the EPA began to consider changes to the United States import and export rules, Canada's only PCB incinerator began to accept PCB wastes from throughout the country, and the EPA proposed denying four petitions to import large volumes of PCB wastes from Canada for disposal in the United States.

Although it is difficult to exactly quantify numbers to the PCBs remaining in the United States or the capacity available to dispose of them, available information indicates that the PCB disposal companies in the United States have the ability to handle larger volumes of PCBs than is currently demanded. However, a decision to open the U.S. borders is not based on capacity alone. Capacity is but one factor under the broad statutory issue of "unreasonable risk of injury" for PCB activities.

With background reports from Canada, the United States, and Mexico, CEC will be well positioned to understand the issues that shape a debate on transboundary PCB disposal issues.



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Subpart C — Marking of PCBs and PCB Items

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761.215 Exception reporting

761.218 Certificate of Disposal

AUTHORITY: 15 U.S.C. 2605, 2607, 2611, 2614 and 2616

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APPENDIX B: PCB ACTIVITIES/USES ALLOWED UNDER TSCA

Activities/Uses	What is allowed	Comments
Authorized Non-Enclosed Uses (40 CFR 761.30)		
Transformers	Use allowed for remainder of useful life. Specific requirements for different types of transformers: inspection, recordkeeping, location, registration, labelling, removing stored combustibles; disposal; notification.	3 classes: < 50 ppm; 50 ppm to 500 ppm; ≥ 500 ppm
Railroad transformers	Use allowed: specific requirements for servicing transformers and reclassification; limits on allowable PCB concentration; last phaseout = 1986.	
Mining equipment	Processing and distribution in commerce of PCBs for servicing mining equipment is permitted for persons with exemptions; requirements for servicing equipment, rebuilding machinery.	
Heat transfer systems	Use allowed if PCB concentration is < 50 ppm; specific requirements for testing, retrofilling procedures and recordkeeping.	When concentration < 50 ppm, no further testing is required.
Hydraulic systems	Use allowed if PCB concentration < 50 ppm; specific requirements for testing, retrofilling procedures and recordkeeping.	When concentration < 50 ppm, no further testing is required.
Carbonless copy paper	May be used in unenclosed manner indefinitely.	Not used any more.
Pigments	Processing and distribution allowed with an exemption.	
Electro-magnets, switches, and voltage regulators	Use allowed at any concentration; requirements for servicing, reclassification, inspection, storage of fluids (for repair) and recycling; restrictions on use near food or feed; prohibits servicing equipment with ≥ 500 ppm PCBs, if work requires manipulation of internal components.	

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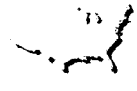
Activities/Uses	What is allowed	Comments
Compressors in the liquid of natural gas pipelines	Use allowed indefinitely at < 50 ppm, provided compressors and pipelines are marked.	
Research and development	Use allowed indefinitely in small quantities; defined as PCBs originally packaged in one or more hermetically sealed container, volume < 5.0 ml and used only for scientific experimentation or analysis. Manufacture, processing and distribution in commerce permitted with exemption.	
Microscopy mounting medium	Use allowed indefinitely. Manufacture, processing and distribution in commerce permitted with exemption.	
Use in capacitors	Use allowed at any concentration; capacitors posing a risk to food or feed prohibited; location of capacitors confined to restricted-access substations or installations.	
Use in and servicing of circuit breakers, reclosers and cable	Use allowed at any concentration in these products; PCBs may be used for servicing these items (with concentration and storage restrictions) for the remainder of their useful lives.	
Microscopy immersion oil	Use allowed indefinitely. Manufacture, processing and distribution in commerce permitted with exemption.	
Optical liquids	Use allowed indefinitely. Manufacture, processing and distribution in commerce permitted with exemption.	
Analytical reference samples	Analytical Reference samples derived from waste materials contain PCBs; Samples analyzed by laboratories that have procedures for handling PCBs.	Added in 11 April 1994 rule (59 FR 16991 - 16999) — the EPA granted an exemption to a company to process and distribute analytical reference samples derived from waste materials containing PCBs in order to create "real world" reference samples. Such use must be specifically authorized by rule.

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Activities/Uses	What is allowed	Comments
No authorizations required for:		
	• excluded PCB products • using PCBs from excluded or recycling process • applying to sewage sludge < 50 ppm	Subject to specific regulatory requirements.
Inadvertent PCB Generation — Excluded Processes (40 CFR 761.3)		
Excluded manufacturing processes include the inadvertent release of PCBs to products, air, and water. The following conditions identify instances where inadvertent PCB generation is excluded from the regulations.		
Concentration limits	Concentration of PCBs in products leaving a manufacturing site or importation to the U.S. have an annual average of < 25 ppm, with a 50 ppm maximum.	
Detergent bars	PCB concentration in detergent bars from manufacturer or importation is less than 5 ppm.	
Air emissions	Release of PCBs at point at which emissions are vented to ambient air < 10 ppm.	
Discharge to water	Amount of PCBs added to water from discharge < 100 micrograms/resolvable gas chromatographic peak per litre of water discharged.	
Disposal	Disposal of process wastes above 50 ppm in accordance with TSCA disposal rules.	
Excluded PCB Products (40 CFR 761.3)		
Excluded PCB products are PCB materials with concentrations < 50 ppm, including but not limited to:		
Process by-products	Non-Aroclor inadvertently generated PCBs as a by-product or impurity from a chemical manufacturing process.	
Historic uses	Products contaminated with PCBs from historic uses.	
Recycled fluids	Recycled fluids and/or equipment contaminated during use involving products described in the previous two examples.	

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Activities/Uses	What is allowed	Comments
Used oils	Used oils containing <50 ppm, and legally manufactured, processed, distributed in commerce, or used before 1 Oct 1984. PCB concentration cannot be below 50 ppm due to dilution via leaks or spills of PCBs > 50 ppm. Note: Products or sources of PCBs in waste oils must have been manufactured, processed, distributed in commerce, or used, pursuant to EPA regulatory authority, exemption petition, settlement agreement, or other agency programs.	Note: General prohibition on waste oil with PCBs.
Small capacitors — light ballasts	No disposal restrictions unless capacitor is leaking.	If leaking, incinerate.
PCB Exemptions (40 CFR 761.3)		
Individual and company exemptions	One year exemption granted to specifically identified companies for designated activities: Processing and distributing in commerce of PCBs for the following uses or activities: - mounting medium in microscopy; - immersion oil in low fluorescence microscopy; - optical liquids; - exporting PCBs for use in small quantities for research and development; - importing (manufacture) into the U.S. small quantities of existing PCB fluids from electrical equipment for analysis; - manufacturing PCBs for use in small quantities for research and development; and - processing and exporting small quantities of PCBs for research and development.	
Renewal of individual and company exemptions	One-year exemptions for all individual companies renewed automatically unless a petitioning company notifies EPA of (1) increased PCB amounts to be processed, distributed, imported, or exported, and (2) any changes in activity.	



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Activities/Uses	What is allowed	Comments
	Unless the EPA initiates rulemaking to terminate the exemption or acts on the petition, petitioner is allowed to continue activities under exemption.	
Class exemptions (research and development)	Class exemption to all processors and distributors of PCBs in small quantities for research and development, provided they meet recordkeeping and reporting conditions.	
(Non-porous transformers)	One-year class exemption granted to members of the Electrical Apparatus Service Association with the following allowances: - The exempted may process and distribute in commerce non-porous transformer component parts that have been decontaminated of PCB residues. - Members may buy and sell certain types of PCB or PCB-Contaminated Transformers. - No provision for renewal.	
Renewal of research and development class exemption	Research and development class exemption is renewed automatically, unless the EPA finds that the activities of any individual or company pose an unreasonable risk of injury to health or the environment. The EPA evaluates the information, issues proposed rules affecting the class exemption or individuals included in the exemption. Until final rule is issued, processing and distributing PCBs for research and development could continue.	Note different standard required to discontinue automatic renewal.
Renewals for exemptions granted after 25 April 1994	Must submit certified letter to the EPA at least 6 months prior to expiration of current exemption, stating that specific types of activities (e.g., procedures for handling PCBs, amount handled, and any other activities listed in original exemption) have not changed. Any changes considered require a new petition submittal.	Change made in final rule issued 11 April 1994 (59 FR 16991-16999).

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Activities/Uses	What is allowed	Comments
Recycled PCBs (40 CFR 761.3)		
Paper products/ asphalt roofing	Recycled PCBs are those PCBs that appear in the processing of paper products or asphalt roofing materials from PCB-Contaminated raw materials. Processes that recycle PCBs must meet the following requirements: - Asphalt roofing products leaving processing sites must not have detectable PCB concentration levels. - Paper products leaving manufacturing sites, or in imported paper products are required to have an annual average < 25 ppm, with a 50 ppm maximum.	
Air emissions	Emissions of PCBs to ambient air must be < 10 ppm.	
Discharge to water	The amount of Aroclor PCBs added to water discharges from asphalt roofing processing sites and the processing of paper products is restricted.	
Disposal	Disposal of any other process wastes with PCBs > 50 ppm falls under storage and disposal rules. (Subpart D)	
Totally Enclosed Activities 40 CFR 761.20		
The DISTRIBUTION IN COMMERCE of the intact, non-leaking electrical equipment listed below constitute "totally enclosed activities." - transformers (including transformers used in railway locomotives and self-propelled cars); - capacitors; - electromagnets; - voltage regulators; - switches (including sectionalizers and motor starters); - circuit breakers; - reclosers; - cable; and - equipment containing non-leaking PCB capacitators.		

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S.D. MYERS' PETITIONS TO IMPORT PCBS FROM CANADA FOR DISPOSAL IN THE U.S.

(Copied from)
Federal Register / Vol. 59, No. 233 / Tuesday, December 6, 1994 / Proposed Rules **62877**

Source: 59 FR 62877-879, December 6, 1994

IV. Disposition of Pending Exemption Petitions

A. Import

EPA received eight exemption petitions to import PCBs. Two of these petitions were withdrawn by the petitioners.

1. *S.D. Myers, Inc. (Myers).* EPA has received a total of four petitions from S.D. Myers, Inc. of Talmadge, Ohio, to import large volumes of PCB waste from Canada for disposal. The first petition was received by EPA on May 15, 1991, the second and third were both received on September 9, 1992, and the fourth was received on October 27, 1993.

a. *Current petitions.* Myers processes PCBs for disposal. It has received approval from EPA to: disassemble, decontaminate, and recycle capacitors, to operate a mobile PCB disposal process, and it has received interim approval to commercially store PCBs.

The petition received on May 15, 1991 (Petition 1) is to import drained PCB Transformers from Canada for purposes of disposal at Myers' facility in Talmadge, Ohio. The petition requests a 5-year exemption, without a limit on quantity. Petition 1 cites data that 21,000 PCB Transformers are in storage for disposal in Canada, and that an additional 10,000 PCB Transformers are still in service, but could be imported for disposal. Myers estimates that if all 31,000 transformers were imported into the United States, approximately 1.8 million pounds of PCBs in those transformers would enter the United States. Once at Myers' facility, the transformers would be disposed of in accordance with Myers' permit from EPA Region V. The transformers would be disassembled, metallic portions would be decontaminated and subsequently smelted for metal recovery, and residual PCBs and porous [*62878] materials would be shipped off site to a TSCA-permitted incinerator.

Myers' second petition, received on September 9, 1992, (Petition 2) is to import intact, non-leaking PCB Capacitors from Canada for disposal. The capacitors would be disposed of by Myers through a disassembly, decontamination, and materials recycling process similar to its transformer process. Myers is permitted by EPA Region V to process capacitors for disposal. Petition 2 requests a 5-year exemption, with no limit on quantity. Myers states that there are 18.6 million pounds of PCB capacitors in Canada, and estimates that 13 million pounds of PCB waste requiring incineration would be generated by the processing of these capacitors at its facility.

The third petition, also received on September 9, 1992, (Petition 3) is a request to import askarel PCB liquids (500 ppm and over) from Canada to the United States for purposes of disposal. The petition cites data that 40 million pounds of high-concentration fluid is present in Canada. Myers would transport the PCBs to a TSCA-approved incinerator for disposal. The PCBs would not be disposed of at Myers' Talmadge, Ohio, facility, but some might be stored there before being incinerated elsewhere. Myers is a permitted PCB transporter and has interim approval as a commercial storer of PCBs. Petition 3 also requests a 5-year period with no limit on quantity.

Myers' fourth petition, received by EPA on October 27, 1993, (Petition 4) is to import intact, non-leaking PCB-containing fluorescent light ballasts from Canada for disposal. The ballasts would be taken to Myers' facility, where they would be processed to recover reclaimable metals, and the contaminated materials remaining would be shipped off site to a TSCA-approved incinerator. EPA Region V has permitted Myers' ballast disposal method. Myers is requesting an exemption for a 5-year period, and estimates that 60 million pounds of PCB containing light ballasts are present in Canada [Canadian Government data from 1991 actually estimates that there are 60 million units present in Canada, which have a total weight of 220 million pounds (see "Canadian PCB Summary: A Summary of National PCB Inventory" January, 1991)]. Myers provides estimates that indicate about 20 percent of the ballast weight would consist of unrecoverable PCB waste [44 million pounds] requiring incineration.

In all four petitions, Myers asserts that since EPA has permitted their disposal processes based on the fact that these processes do not pose an unreasonable risk of injury to health or the environment, this finding should be applied to any PCB waste imported from Canada for purposes of disposal. Petition 3, which does not involve in-house disposal activities but only transportation and storage, cites the

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overall safety record and safety procedures of the company as grounds for a no unreasonable risk finding, and specifically asserts that Myers' PCB tank truck fleet "has not had an accident or spill when moving PCBs."

In terms of benefits, Myers estimates in Petition 1 that by importing all of Canada's PCB transformers, it would generate $ 180 million in service fees, and an additional $ 20 million in scrap metal sales. Petitions 2, 3 and 4 are estimated to generate revenues of $ 46 million, $ 30 million, and $ 45 million, respectively. Myers estimates that Petition 3 would earn a profit of $ 20 million for Myers and the incinerators (the other petitions do not provide profit estimates). In addition, Petitions 2 and 4 state that each would create an additional 20 jobs. Other benefits mentioned in the petitions include speeding the removal of PCBs from North America and a lowering of disposal costs for companies in Canada.

In response to the good faith efforts criteria of TSCA section 6(e)(3)(B)(ii) have been met, Myers maintains in all four petitions that this criteria is not applicable to his petitions. Petition 1 does, however, go on to state that Myers has investigated the possibility of destroying these wastes in Canada, but concluded that it would not be politically or economically feasible to do so.

b. *Proposed decision on petitions.* EPA proposes to deny all four petitions from S.D. Myers. EPA has determined that the petitioner has failed to establish that there is no unreasonable risk as required in TSCA section 6(e)(3)(B). The petitioner has not demonstrated how the benefits accruing from granting these petitions would outweigh the risks inherent in the importation of PCB waste as proposed by petitioner. In addition, EPA believes that the petitioner has failed to demonstrate that it has made a good faith efforts to investigate and develop alternatives to import.

EPA has already made a general determination that the import of PCBs into the United States and the distribution in commerce of PCBs present an unreasonable risk of injury to human health and the environment [See 40 CFR 761.20 and 44 FR 31514, May 31, 1979]. EPA has also stated that "[i]t is the clear intent of TSCA to minimize the addition of PCBs to the environment of the United States." Id. Moreover, while EPA believes that there is always some risk inherent in the import of any quantity of PCBs, the large quantities that Myers would import significantly increases the risk.

All four of Myers' petitions would involve the importation, transportation, and disposal of very large quantities of PCB waste. Taken together, they would account for most of Canada's PCB fluids at concentrations over 500 ppm, as well as all of its PCB Transformers, PCB Capacitors and PCB-containing fluorescent light ballasts. Myers indicates in the four petitions that over a 5 year period it wishes to import a total of approximately 300 million pounds of PCB waste for disposal. Based on the data supplied in the petitions and supplemental information (see note to docket "Calculations"), EPA calculates that the four petitions could involve the importation of up to 457 million pounds of PCB waste into the United States, for disposal either at Myers' Talmadge, Ohio facility, or, in the case of Petition 3, at an unspecified TSCA-approved incinerator.

Prior to disposal, Myers would transport large quantities of PCB waste through the United States either to the Ohio site or to an incinerator. Subsequent to Myers' disposal activity in Ohio, an additional 60 to 90 million pounds of concentrated PCB waste (not counting any additional solvents and process waste that Myers would generate) would have to be transported from Ohio to a TSCA-approved incinerator. Currently, the closest available incinerator is located in Coffeyville, Kansas (Aptus, Inc.). In information supplemental to the petitions, Myers estimates that an average truckload for such waste would weigh 40,000 pounds. Using this estimate, EPA calculates that 7,500 to 11,750 truckloads of waste would be shipped to Talmadge, and an additional 1,500 to 2,250 truckloads would be shipped from Talmadge for incineration.

Myers has failed to demonstrate that the proposed activity would not pose a risk to health and environment in the United States. The introduction and disposal of large volumes of PCBs would pose some risk of exposure, even if the PCBs are disposed of in an EPA-permitted facility such as Myers' Ohio facility or other TSCA-approved incinerator. In addition, the large volumes of PCBs that would be transported to various facilities in different parts of the United States pose a potential risk of spills or other exposure to PCBs despite the past safety record of the transporting company.

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Myers also has failed to submit adequate information with respect to the benefits of the proposed activity. Myers states that one of the benefits would be additional revenues for the company. With the exception of Petition 3, however, Myers has provided revenue information only with respect to gross revenues. Gross revenue estimates tend to overinflate the actual financial benefit to the petitioner. To properly evaluate the financial impacts, EPA needs additional information regarding any costs that might offset projected gross revenues.

In addition, Myers has failed to substantiate its claim that the United States would benefit by the removal of PCBs that are stored in Canada and the elimination of possible risk of crossborder contamination. EPA acknowledges that there is a possibility that some PCBs stored in Canada could pose some risk to health or environment in the United States. Myers, however, has not presented factual information to demonstrate why PCBs stored in Canada pose such a risk or to show the extent of the risk to health and environment in the United States.

The Canadian government regulates the storage and disposal of PCBs in that country which should provide adequate protection against releases or spills that could threaten the United States. Moreover, Canada possesses a domestic disposal facility, and is in the process of expanding its PCB disposal resources (Memo from Bryan to Greenwood, June 25, 1991). The government also has some mobile disposal facilities. Id. Some of these facilities may be available to dispose of the PCBs that Myers proposes to import into the United States.

Myers also states that lowered disposal costs for Canadian companies constitute an additional benefit of the proposed activities. Under TSCA, however, EPA does not consider benefits that may occur accrue to foreign businesses, just as it does not consider risks that do not threaten domestic health or the environment.

EPA is proposing to deny Myers' petitions because Myers has failed to demonstrate that the risks of the proposed activity are reasonable when weighed against the benefits, particularly in view of the limited information available to substantiate the alleged benefits.

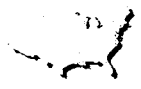
Myers contends that the proposed disposal activities do not pose an unreasonable risk by noting that the facilities that would dispose of the PCBs are permitted by EPA pursuant to 40 CFR 761.60(e). Section 761.60(e) authorizes EPA to issue a permit if the method of destroying PCBs will not present an unreasonable risk of injury to health or the environment. Under this provision, EPA weighs the risk of the disposal methodology against the benefits to the health and environment in the United States. The fact that EPA has determined that the benefits outweigh the risks when the activity involves the disposal of domestic PCBs that are already present in the United States, however, does not demonstrate that the benefits outweigh the risks when the activity involves disposing of foreign PCBs that would be introduced into this country. The introduction of additional PCBs that would otherwise not be in the United States adds an additional factor to the risk/benefit equation.

EPA further finds grounds to deny the petitions based on the good faith efforts criteria of TSCA section 6(e)(3)(B)(ii). Petition 1 maintains that this criteria is "not really applicable," in that Myers only wishes to import PCBs for disposal, and not for use in commerce; however, the petition does go on to discuss other disposal options. The subsequent three petitions simply state that the good faith efforts criteria does not apply, and provide no discussion of alternatives. While, strictly speaking, section 6(e)(3)(B)(ii) refers to finding substitute chemicals, EPA believes that under this section it must generally consider the issues of the availability of alternatives, and the overall necessity for granting an exemption. The alternative to importation of Canadian PCB waste into the United States for destruction is to destroy those wastes in Canada itself. Myers maintains in Petition 1 that it has investigated the possibility of setting up a facility in Canada to recycle/destroy PCB Transformers, and it concluded that it would be uneconomical and politically difficult to establish a facility in Canada. However, Myers fails to demonstrate that establishing a facility in Canada is not feasible; rather, Myers only forwards arguments as to why doing so is less expedient and less profitable for Myers than importing the waste to its existing facility in the United States. Myers does not provide any evidence that it made substantial good faith efforts to pursue such an option before it petitioned the Agency for this exemption. More importantly, Canada already possess a domestic disposal facility, and is in the process of expanding its PCB disposal resources. There are no technological barriers to the effective destruction of PCBs in Canada that would necessitate their shipment to the United States for

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safe disposal. Myers has not demonstrated the necessity for the PCBs in question to be imported to the United States for disposal, and accordingly EPA finds that all four petitions have failed to meet the good faith efforts criteria.

Although Myers has not submitted adequate information to allow the Agency to make the requisite findings for these four specific exemptions to import Canadian PCBs for disposal, EPA is considering whether to amend existing PCB disposal rules to modify the general restriction on the import of PCBs with 50 ppm or greater for disposal. EPA believes that opening the border to allow import for disposal may have far-reaching consequences and that it is preferable to raise the issue of the transboundary movement of PCB waste generally in the proposed disposal rules rather than to examine it in isolation in the context of individual company's petitions for exemption. In the proposed disposal rules, EPA is requesting comment on the circumstances under which the United States border should be opened to the transboundary shipments of PCBs for disposal. The proposal, if finalized, would retain the general prohibitions on import of PCB wastes at concentrations of 50 ppm or greater, with certain exceptions described in more detail in the preamble to the proposed disposal rule.



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APPENDIX B: PROPOSED CHANGES TO U.S. RULES FOR PCB IMPORTS AND EXPORTS FOR DISPOSAL

(Copied from)
Federal Register / Vol. 59, No. 233 / Tuesday, December 6, 1994 / Proposed Rules

Transboundary movement of PCBs for disposal. EPA periodically receives requests from individuals wishing to import or export PCBs for disposal. Current regulations at 40 CFR 761.20(b)(2), promulgated under section 6(e)(1) of TSCA, authorize the import or export for disposal of PCBs only at concentrations less than 50 ppm. EPA believes there are instances where the import or export for disposal of PCBs at higher concentrations would not pose an unreasonable risk of injury to health or the environment. EPA therefore proposes to amend Sec. 761.20(b)(2) and add Sec. 761.20(b)(3) to create certain categorical exceptions to the general ban on import for disposal of PCBs at 50 ppm or greater and to clarify what constitutes import or export for purposes of this regulation. This proposal would also establish a petition procedure under proposed Secs. 761.20(b)(4) and (c)(3) under which other imports and exports for disposal could be allowed on a case-by-case basis. This section of the proposal would not alter the current ban on import or export of PCBs at 50 ppm or greater for purposes other than disposal (including import for use, reuse, or recycling), or affect the meaning of the terms "import" or "export" for any other provisions of TSCA.

When EPA addressed the issue of import and export for disposal in 1979, it noted that regulation of these types of activities could be accomplished under TSCA section 6(e)(1), which governs disposal activities, or alternatively under section 6(e)(3), which governs manufacture and import activities (44 FR 31514, 31526 (May 31, 1979)). Based upon the authority in section 6(e)(1), EPA elected to issue comprehensive regulations that temporarily authorized the import and export of PCBs for disposal, otherwise known as the "Open Border Policy." EPA decided not to extend these regulations in 1980 and they expired (45 FR 29115 (May 1, 1980)).

In 1984, EPA issued the current PCB regulations that address import and export for disposal (40 CFR 761.20(b) and 761.60(h)). Section 761.60(h) provides that the import and export of PCBs and PCB Items for purposes of disposal are regulated under section 761.20. Section 761.20(b)(2) author-izes only the import or export for disposal of PCBs at concentrations of less than 50 ppm. The current rules do not authorize import or export for disposal of PCBs at higher concen-trations. In the absence of a general rule that allows the import or export for disposal of such PCBs, the only way that such wastes may currently be imported or exported is if EPA grants an exemption pursuant to TSCA section 6(e)(3).

This rule is designed to control the transboundary movement of PCB waste in a manner consistent with the Basel Convention on the Control of Transboundary Movement of Hazar-dous Wastes and their Disposal. EPA is requesting comment on the circum-stances under which the U.S. border should be opened to transboundary shipments of PCBs for disposal. The options range from allowing all imports for disposal under section 6(e) to maintaining the current closed border status, and might include opening the border to PCBs from a limited geographic area such as the Great Lakes drainage basin. Today's proposal, if finalized, would retain the general prohibitions on import and export of PCB wastes at concentrations of 50 ppm or greater, with certain exceptions described below.

Import. Proposed Sec. 761.20(b)(2) would allow three exceptions to the general prohibition on import of PCBs for disposal. Proposed Sec. 761.20(b)(3) would clarify what constitutes import for purposes of this regulation. EPA could add categorical exceptions to proposed Sec. 761.20(b)(2) and (b)(3) should the need arise in the future.

(1) *Imports of PCBs at concentrations less than 50 ppm.* Because the Administrator has made the finding that PCBs at concentrations less than 50 ppm present no unreasonable risk to health or the environment, import for disposal of these PCBs would continue to be allowed.

(2) *Import of PCB wastes from United States territories or possessions that are outside the customs territory of the United States into the customs territory of the United States for disposal.* TSCA and the regulations issued thereunder at 40 CFR Part 761 regulate the manufacture, import, distribution, processing, use, storage, and disposal of PCB waste in the United States. The terms "United States" and "States" are defined at sections 3(13) and 3(14) of TSCA to include "any state, D.C., Puerto Rico, Virgin Islands, Guam, the Canal Zone, American Samoa, Northern Mariana Islands, or any other territory or possession of the United States." TSCA does not define imports specifically, but section 13 of TSCA requires the

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Secretary of the Treasury to refuse entry into the customs territory of the United States (as defined in general headnote 2 of the Tariff Schedules of the United States) of any chemical substance, mixture, or article offered for entry if it fails to comply with any rule under TSCA. In the Tariff Schedules, "customs territory of the United States" is defined as "any State of the United States, the District of Columbia, and Puerto Rico." Thus, a problem arises when a territory or possession which is outside the customs territory of the United States attempts to ship PCB wastes back into the customs territory of the United States for disposal. Any such transfer of such PCB wastes at concentrations of 50 ppm or greater would be considered a prohibited import under existing regulations. This is problematic because most United States territories and possessions outside the customs territory do not have adequate disposal facilities. Since PCBs persist in the environment, improper disposal of PCBs in those territories or possessions could create an unreasonable risk to health or the environment in the territory or possession of the United States. Therefore, EPA proposes to allow transfers of PCBs from United States territories or possessions that are outside the customs territory of the United States into the customs territory of the United States for disposal.

(3) *Imports of PCBs for disposal where EPA determines that it is in the interests of the United States and will not result in unreasonable risks to health or the environment.* In addition to the categorical exceptions listed above, there may be instances in which it would be in the interests of the United States to allow import of PCBs for disposal. This might be the case where PCBs were located outside the United States, but in close proximity to the United States, and adequate disposal facilities were not available in the country in which they were located. Import of the PCBs into the United States for disposal might be in the interests of the United States to mitigate an unreasonable risk to health or the environment in the United States that could not be mitigated by other means. It might be in the interests of the United States to allow import of PCBs for disposal to implement a federal law such as CERCLA, or to carry out United States obligations under a treaty or other international agreement. EPA would not be inclined to find that import for disposal was in the interests of the United States solely because disposal of the PCBs in this country was less expensive. EPA proposes to allow imports for disposal that are in the interests of the United States on a case-by-case basis where they would not pose an unreasonable risk of injury to health or the environment.

Under its section 6(e)(1) authority to regulate disposal, EPA proposes to allow these case-by-case exceptions to the ban on import for disposal of PCBs at concentrations of 50 ppm or greater at EPA's initiative or in response to a petition. Under proposed Sec. 761.20(b)(4), any person may petition EPA for an exception to the prohibition on import for disposal, and EPA may grant such an exception if it finds that to do so would be in the interests of the United States and would not result in unreasonable risk of injury to health or the environment.

Petitions would be filed with the Director, Chemical Management Division. The Director has the authority to issue TSCA PCB disposal approvals in certain instances and is responsible for coordination and oversight of PCB disposal activities in the United States. Therefore, the Director is in the most advantageous position to require proper disposal of imported PCBs. Petitions would have to be submitted on an individual basis for each individual that would be subject to the exception. If EPA determined that it was appropriate to create a categorical exception, it could do so by adding through rulemaking to the categorical exceptions proposed at Sec. 761.20(b)(2) and (b)(3). Information to be included in the petition is specified at proposed Sec. 761.20(b)(4)(i) through (vii). The petitioner would be notified of EPA's decision by letter.

To implement the proposed Sec. 761.20(b)(2) through (4), EPA is also proposing at Sec. 761.20(b)(5) that all PCBs at concentrations greater than or equal to 50 ppm that are imported for disposal must be disposed of in an EPA designated facility which has a TSCA PCB disposal approval. Each facility's TSCA PCB disposal approval would have to contain specific conditions addressing at a minimum its desig-nation to receive specified shipments of imported PCBs for disposal, analytical data on wastes to be imported including their compatibility with the facility's approved waste disposal techniques, prior notification and certification to EPA of adequate disposal capacity, use of the manifest system, provisions for financial responsibility for the imported PCBs from the port of entry through final disposal, appropriate recordkeeping for these activities, and any other conditions that EPA

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found were necessary to ensure that the import and disposal of PCBs did not present an unreasonable risk of injury to health or the environment. Since EPA cannot easily reach foreign generators of imported PCBs to enforce liability provisions of TSCA or other Federal statutes and cannot be assured that shipments of imported PCBs could be returned to their country of origin if they could not be disposed of at the designated facility, conditions would be included in disposal approvals to address these situations. Imported PCBs could also be decontaminated under the proposed changes to Sec. 761.79. However, the PCBs would have to be imported to a commercial storage facility which had a PCB commercial storage approval, unless exempt, including special approval conditions for imported wastes, as noted above.

Export. When EPA announced the expiration of the Open Border Policy in 1980 it stated, with regard to exports, that it would not grant an exemption unless the nation to which the export was destined had proper facilities for ultimate disposal (See 45 FR 29115). EPA believes that export of PCBs to other countries needs to be limited so as not to pose a risk of injury to health or the environment in those countries and that to the maximum extent practicable, each nation should manage its own waste within its own borders. Therefore, EPA is proposing at Sec. 761.20(c)(3) to allow export for disposal of PCB waste at concen-trations of 50 ppm or greater on a case-by-case basis unless EPA has reason to believe that the PCBs in question will not be properly managed, where the receiving country has an international agreement consistent with the international obligations of the United States relating to transboundary movements of PCBs and their disposal, with the U.S. Government concerning such exports; the government of the receiving country certifies to EPA that it has received accurate and complete information about the waste, consents to receive it, and has adequate disposal facilities to assure proper management; and the exporter identifies waste containing liquid PCBs or PCB-containing electrical equipment. As an example, vessels are sometimes exported for salvage of the considerable amounts of metal they contain. PCBs present in integral components of the ships, such as wire cable or air handling system gaskets, could be exported with the ship under conditions specified in the export approval. EPA could require as a condition of approval for export that PCBs found in large capacitors, transformers, and hydraulic or heat transfer fluids, be removed prior to export for disposal. EPA could allow such exports for disposal on its own initiative or in response to a petition. Other information that would have to be included in the petition is set out at proposed Secs. 761.20(c)(3).

Other transboundary shipments. Certain types of movement of PCB wastes across national borders is not considered to be either import or export.

(1) *Transport of PCB waste generated in the United States through a foreign country (and any residuals resulting from cleanup of spills of such waste in transit) for reentry into the United States for disposal.* The proposal would clarify that PCB waste generated in the United States may be transported through a foreign country and returned to the United States for disposal. For example, PCB waste generated in Michigan could be transported across Canada for disposal in New York. Any residual PCB waste resulting from the cleanup of spills that might occur in transit could also be brought into the United States for disposal. Otherwise, it would be impractical and inefficient to transport PCBs generated in certain parts of the United States to nearby United States disposal facilities. This provision is included in Sec. 761.20(b)(3) as a clarification. For purposes of this regulation, EPA considers such shipments to be transit shipments, not exports or imports.

(2) *Return for disposal of wastes that result from PCBs that were procured domestically by the U.S. Government, taken overseas for use by the U.S. Government, and that have remained under U.S. Government control since the time of procurement (including any residuals resulting from cleanup of spills of such wastes during use, storage, or in transit).* In conjunction with U.S. Government operations, PCBs may be taken to United States facilities abroad for use. Because these PCBs have always been the property of the United States, and because disposal facilities for these wastes might not be readily available overseas, they would be permitted back into the United States for disposal along with any residuals resulting from cleanup of spills occurring during use, while in storage for reuse or awaiting shipment for disposal, or in transit. For purposes of this regulation, EPA would not consider these shipments to be exports or imports.

(Federal Register / Vol. 59, No. 233 / Tuesday, December 6, 1994)

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Proposed New Rules
§761.20 Prohibitions and Exceptions.

(b)(1) No person may manufacture PCBs for use within the United States or manufacture PCBs for export from the United States without an exemption, except that an exemption is not required for PCBs manufactured in an excluded manufacturing process as defined in Sec. 761.3, provided that all applicable conditions of Sec. 761.1(f) are met.

(2) No person may import PCBs or PCB Items for purposes of disposal except that:

(i) PCBs at concentrations less than 50 ppm may be imported for disposal.

(ii) PCBs may be imported from United States territories or possessions outside the customs territory of the United States into the customs territory of the United States for disposal.

(iii) PCBs may be imported for disposal pursuant to paragraph (b)(3) of this section where EPA determines that it is in the interests of the United States and will not result in unreasonable risk of injury to health or the environment.

(3) PCBs may be excepted from the prohibition on import for disposal imposed by paragraph (b)(2) of this section at EPA's initiative or in response to a petition submitted in accordance with this paragraph. Any person may file a petition for an exception to the import prohibition. Petitions shall be submitted to the Director, Chemical Management Division (7404), 401 M St., SW, Washington, DC 20460. Petitions must be submitted on an individual basis for each individual subject to the prohibition. Each petition shall contain the following information:

(i) Name, address, and telephone number of petitioner.

(ii) Description of the import for disposal exception requested, including items to be imported and disposal method.

(iii) Current locations of PCBs to be imported and of each proposed disposal site.

(iv) Length of time requested for the exception.

(v) Amount of PCB chemical substance or PCB mixture (by pounds and/ or volume) to be imported and disposed of during requested exception period.

(vi) The basis for the petitioner's contention that an exception would be in the interests of the United States and would not result in unreasonable risk of injury to health or the environment. EPA will review and evaluate petitions and may request further information from the petitioner to assess the proposed exception adequately. Any exception granted under this paragraphs shall be subject to the terms and conditions prescribed by the Agency. EPA reserves the right to impose limits on the duration of each exception. EPA will inform the petitioner in writing of its decision. Denial of a petition is a final agency action.

(4) All PCBs at concentrations greater than 50 ppm imported for disposal under paragraphs (b)(2) and (b)(4), and all PCBs subject to Sec. 761.60 of this part and returned for disposal under paragraph (b)(3) of this section:

(i) Shall be stored and disposed of in a facility which has a PCB storage or disposal approval issued under TSCA, where the approval has specific conditions concerning the import, storage, or disposal of imported PCBs.

(ii) May be decontaminated under Sec. 761.79 provided the imported PCBs are stored in accordance with the provisions of subparts D, J, and K of this part, for the commercial storage of PCB wastes.

(5) No person may export PCBs or PCB Items for purposes of disposal except that:

(i) PCBs at concentrations less than 50 ppm may be exported for disposal.

(ii) EPA may allow the export for disposal of PCBs at concentrations of 50 ppm or greater to countries with which the United States has an international agreement consistent with the international obligations of the United States relating to transboundary movement of PCBs and their disposal. Such exports would be allowed on a case-by- case basis unless EPA has reason to believe that the PCBs in question will not be properly managed, either at EPA's initiative or in response to a petition submitted in accordance with this paragraph. Any person may file a petition. Petitions shall be submitted to the Director, Chemical Management Division (7404), 401 M St., SW, Washington, DC 20460. Petitions must be submitted on an individual basis for each generator or individual requesting authority to export PCBs for disposal. Each petition shall contain the following information:

(A) Name, address, and telephone number of petitioner.

(B) Description of the export for disposal exception requested, including items to be exported and disposal facility.

(C) Current locations of PCBs to be exported and of each proposed disposal site.

(D) Length of time requested for the exception.

(E) Amount of PCB chemical substance or PCB mixture (by pounds and/ or volume) to be exported and disposed of during requested exception period.

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(F) Documentation of an international agreement between the United States Government and the government of the receiving country concerning export of such waste.

(G) Certification by the government of the receiving country to EPA that it has received accurate and complete information about the waste, consents to receive it, and has adequate disposal facilities to assure proper management.

(H) Identification by the exporter of any liquid PCBs or PCB- containing electrical equipment. EPA will review and evaluate petitions and may request further information from the petitioner to assess the proposed exception adequately. Any exception granted under this subsection shall be subject to the terms and conditions prescribed by the Agency. EPA reserves the right to impose limits on the duration of each exception. EPA will inform the petitioner in writing of its decision. Denial of a petition is a final agency action.

(6) For purposes of this regulation, the following transboundary shipments will not be considered exports and imports:

(i) PCB wastes generated in the United States, transported through another country (and any residuals resulting from cleanup of spills of such wastes in transit), and returned to the United States for disposal.

(ii) PCBs that were procured domestically by the United States Government, taken overseas for use by the United States Government, and that have remained under United States Government control since the time of procurement (including any residuals resulting from cleanup of spills of such wastes during use, storage, or in transit).

(c) * * *

(2)(i) Processing activities which are primarily associated with and facilitate storage or transportation for disposal do not require a TSCA PCB disposal approval.

(ii) Processing activities which are primarily associated with and facilitate treatment or land disposal require a TSCA PCB disposal approval unless they are part of an existing approval or are part of a self-implementing activity such as Sec. 761.61(a) and Sec. 761.79 or otherwise specifically allowed under subpart D of this part.

(iii) With the exception of provisions in Sec. 761.60(a)(2) and (3), in order to meet the intent of §761.1(b), processing, diluting or otherwise blending of waste prior to being introduced into a disposal unit for purposes of meeting a PCB concentration limit shall be included in a TSCA PCB disposal approval or comply with the requirements of §761.79.

(iv) The rate of delivering liquids or non-liquids into a PCB disposal unit shall be part of the conditions of the TSCA PCB disposal approval for the unit when an approval is required.

(v) PCBs or PCB Items at >50 ppm may be distributed in commerce for purposes of disposal in accordance with the requirements of this part.

(3)(i) PCBs or PCB Items at concentrations less than 50 ppm may be exported for disposal.

(ii) EPA may allow the export for disposal of PCBs at concentrations of 50 ppm or greater to countries with which the United States has an agreement under international law concerning export of such wastes. Such exports would be allowed on a case-by-case basis at EPA's initiative or in response to a petition submitted in accordance with this paragraph. Any person may file a petition. Petitions shall be submitted to the Director, Chemical Management Division (7404), 401 M St., SW, Washington, DC 20460. Petitions must be submitted on an individual basis for each generator or individual requesting authority to export PCBs for disposal. Each petition shall contain the following information:

(A) Name, address, and telephone number of petitioner.

(B) Description of the export for disposal exception requested, including items to be exported and disposal facility.

(C) Current locations of PCBs to be exported and of each proposed disposal site.

(D) Length of time requested for the exception.

(E) Amount of PCB chemical sub-stance or PCB mixture (by pounds and/ or volume) to be exported and disposed of during requested exception period.

(F) Documentation of an agree-ment in international law between the U.S. Government and the government of the receiving country concerning export of such waste.

(G) Certification by the govern-ment of the receiving country to EPA that it has received accurate and complete information about the waste, consents to receive it, and has adequate disposal facilities.

(H) Identification by the exporter of any liquid PCBs or PCB- containing electrical equipment. EPA will review and evaluate petitions and may request further information from the petitioner to assess the proposed exception adequately. Any exception granted under this section shall be subject to the terms and conditions prescribed by the

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Agency. EPA reserves the right to impose limits on the duration of each exception. EPA will inform the petitioner in writing of its decision. Denial of a petition is a final agency action.

* * * * *

(5) Equipment, structures, or other materials that were contaminated with PCBs because of spills from, or proximity to, a PCB Item >50 ppm, and which are not otherwise authorized for use or distribution in commerce under this part, may be distributed in commerce or used, provided:

(i) These materials were decontaminated in accordance with a PCB approval under this part, applicable decontamination standards and procedures in §761.61(a) or §761.79, or applicable EPA PCB spill cleanup policies in effect at the time of the decontamination or, if not previously decontaminated, at the time of the distribution in commerce or use, or that now meet a decontamination standard established in §761.79.

(ii) These materials shall not be used or reused in association with food, feed, or drinking water unless otherwise allowed.

(6) Water which contains PCBs and which has been decontaminated to meet or which meets the standards established in Sec. 761.79(h) may be distributed in commerce or used, without further restriction, under this part.

(7) Non-porous surfaces, with no free flowing liquids, which have come in contact with PCBs and which are contaminated at a concentration less than 50 ppm, regardless of the original PCB concentration of the fluid, may be distributed in commerce or reused except in association with food, feed or drinking water.

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APPENDIX E: COMMERCIAL PCB STORAGE FACILITIES IN THE UNITED STATES

EPA Region	Facility	Location	Notes
I	Clean Harbors Environmental	Braintree, MA	
I	Clean Harbors Environmental	Natick, MA	TSCA commercial storage exemption due to RCRA status
I	East Coast Environmental	New Haven, CT	
I	General Electric	Pittsfield, MA	
I	Jet-Line Environmental	Dover, HN	
I	Pollution Solutions	Williston, VT	TSCA commercial storage exemption due to RCRA status
I	Clean Harbors Environmental	Bristol, CT	
I	Transformer Service, Inc.	Concord, NH	
II	Cycle Chem, Inc.	Elizabeth, NJ	
II	General Electric Service Center	North Bergen, NJ	
II	Lionetti Oil Recovery Co., Inc.	Old Bridge, NJ	
II	Envirogen Laboratories	New Brunswick, NJ	
II	Art International	Randolph, NJ	
II	Envirogen Laboratories	Lawrenceville, NJ	
II	Art International	Denville, NJ	
II	Hazardous Substances Management Research Center	Newark, NJ	
II	S & W Waste, Inc.	South Kearney, NJ	
III	Environmental Protection Services	Wheeling, WV	Under 500 ppm; final approval
III	USPCI (PPM, Laidlaw)	Philadelphia, PA	
III	Chemical Waste Management	Sealston, VA	
III	General Electric	Philadelphia, PA	
III	Heavy Duty Electric (General Signal)	Berwick, PA	Final approval
III	Laidlaw Environmental Services	Laurel, MD	
III	Mid Electric	Columbia, MD	Not in business anymore

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EPA Region	Facility	Location	Notes
III	Republic Environmental Systems	Hatfield, PA	
IV	Chemical Waste Management	Emelle, AL	
IV	Hevi Duty Electric	Pell City, AL	
IV	Power Service Center	Muscel Shoals, AL	
IV	Trans Cycle Industries	Pell City, AL	
IV	Florida Transformer, Inc.	Defuniak Springs, FL	
IV	Laidlaw	Clearwater, FL	
IV	PPM Tucker	Tucker, GA	
IV	Safety Kleen Corp	New Castle, KY	
IV	Unison Transformer	Henderson, KY	
IV	Ecoflo Inc.	Greensboro, NC	
IV	Laidlaw	Reidsville, NC	
IV	Safety Kleen Corp	Lexington, SC	
IV	American Ind Waste	White Bluff, TN	
IV	Laidlaw	Greenbrier, TN	
V	TransEnd	Ashtabula, OH	
V	S.D. Myers Trans. Consultants	Tallmadge, OH	
V	Hevi-Duty Electric	Mt. Vernon, IL	
V	Laidlaw Environmental Services	Pecatoniza, IL	
V	General Electric	Chicago, IL	
V	Safety-Kleen	E. Chicago, IN	
V	Great Lakes Environmental Services	Warren, MI	
V	Drug & Laboratory	Plainwell, MI	
V	DYNEX Environmental	Farmington Hills, MI	
V	Minnesota Power	Duluth, MN	
V	Northern States Power	Minneapolis, MN	
V	Aptus	Lakeville, MN	
V	Clean Harbors, Spring Grove Resource Recovery	Cincinnati, OH	
V	Environmental Enterprises	Cincinnati, OH	
V	PPM Transcore (USPCI)	Twinsburg, OH	
V	ENSR Operations	Canton, OH	
V	ENSR Operations	Columbus, OH	

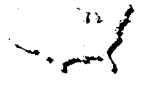


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EPA Region	Facility	Location	Notes
V	Chemical Waste Management	Groveport, OH	
V	General Electric	Cleveland, OH	
V	General Electric	Cincinnati, OH	
V	Clean Harbors	Chicago, IL	Commercially store up to 500 gallons PCBs
V	U.S. Transformer	Jordan, MN	Commercially store up to 500 gallons PCBs
VI	Transformer Disposal Specialists, Inc.	Tonkawa, OK	
VI	ENSCO, Inc.	El Dorado, AR	
VI	General Electric	Houston, TX	
VI	Chemical Waste Management	Carlyss, LA	
VI	Rollins Environmental Service	Deer Park, TX	
VI	Chemical Waste Management	Port Arthur, TX	
VI	Laidlaw	La Porte, TX	
VI	Safety Kleen	Denton, TX	
VI	USPCI Lone Mountain	Waynoka, OK	
VII	Aptus, Inc	Coffeyville, KS	
VII	PPM / Laidlaw	Kansas City, MO	
VII	Tipton Environmental Technology	Tipton, MO	
VII	Trinity Chemical Company	Shawnee Mission, KS	
VIII	Aptus	Aragonite, UT	
VIII	PPM/USPCI/Laidlaw	Clive, UT	
VIII	USPCI/Laidlaw	Knolls, UT	
VIII	T & R Service Co.	Colman, SD	
VIII	Helper, Inc.	Madison, SD	
VIII	Chemical Waste Management, Inc.	Henderson, CO	
VIII	General Electric Service Center	Denver, CO	
IX	Chemical Waste Management, Inc	Phoenix, AZ	
IX	Chemical Waste Management, Inc	Rancho Cordova, CA	
IX	General Electric Co.	Anaheim, CA	

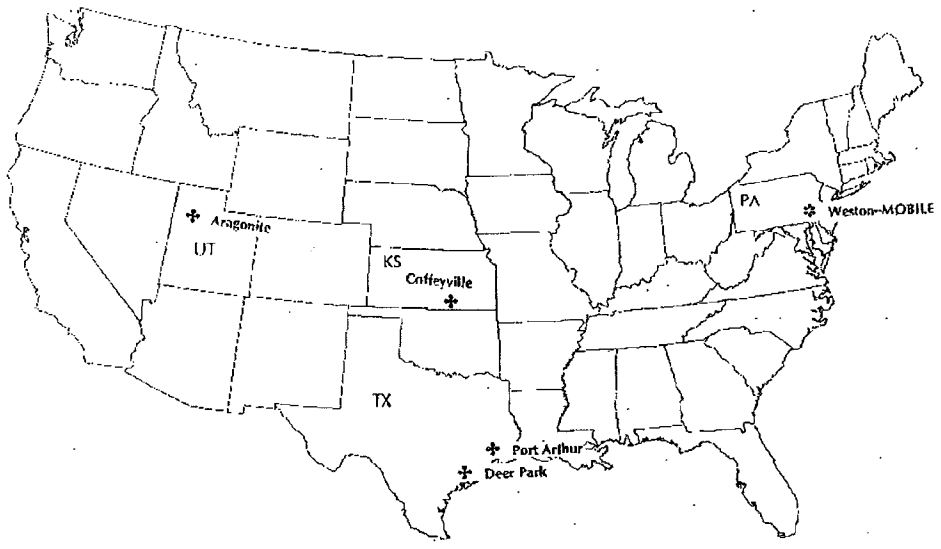
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EPA Region	Facility	Location	Notes
IX	Oil Process Co.	Los Angeles, CA	
IX	Salesco Systems USA-AZ	Phoenix, AZ	
IX	S.D. Myers, Inc.	Kingman, AZ	
IX	Unitek Environmental Services, Inc.	Honolulu, HI	
X	Envirosafe Services of Idaho, Inc	Grandview, ID	
X	Chemical Waste Management	Arlington, OR	
X	General Electric	Portland, OR	
X	Burlington Environmental	Seattle, WA	
X	Burlington Environmental	Kent, WA	
X	Burlington Environmental	Washougal, WA	
X	Northwest Enviro Service	Seattle, WA	Going through closure, not accepting waste
X	Eastern Electric Apparatus Repair	Seattle, WA	

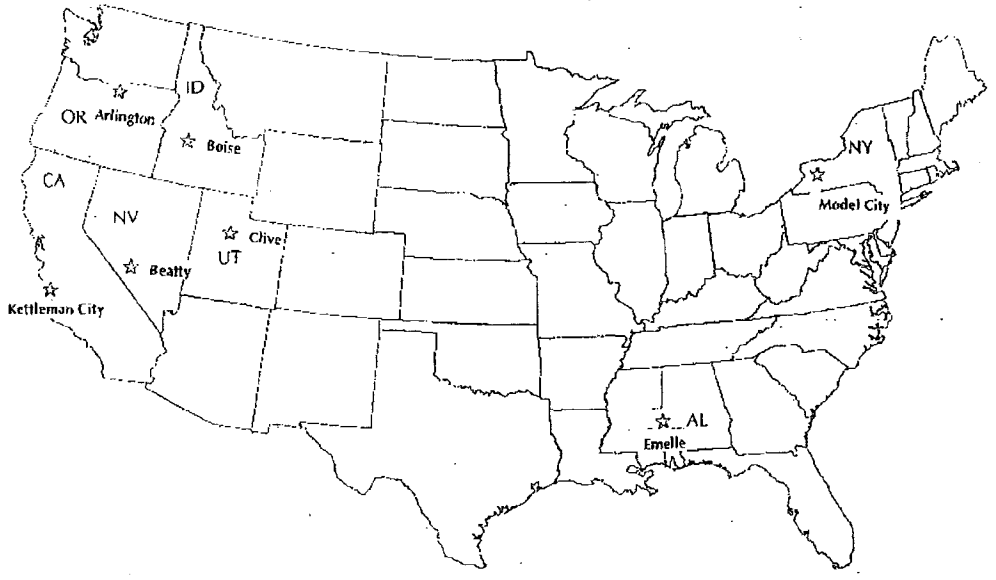


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APPENDIX F: MAPS OF COMMERCIAL PCB DISPOSAL FACILITIES (BY DISPOSAL TYPE)



Commercial PCB Disposal Facilities – Incinerators



Commercial PCB Disposal Facilities – Chem. Waste Landfills

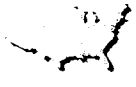
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Commercial PCB Disposal Facilities – Chemical Dechlorination

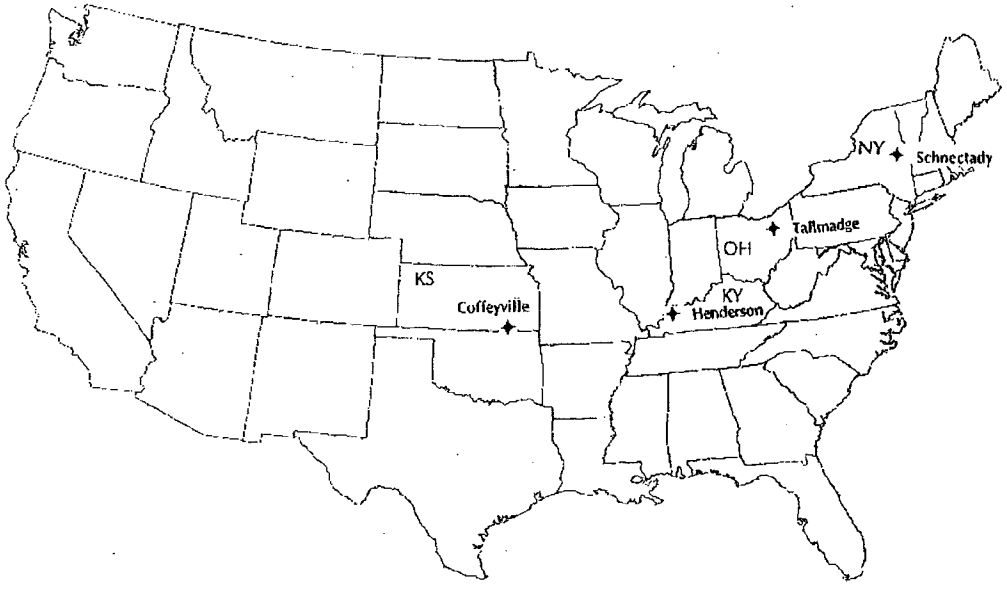


Commercial PCB Disposal Facilities – Biological



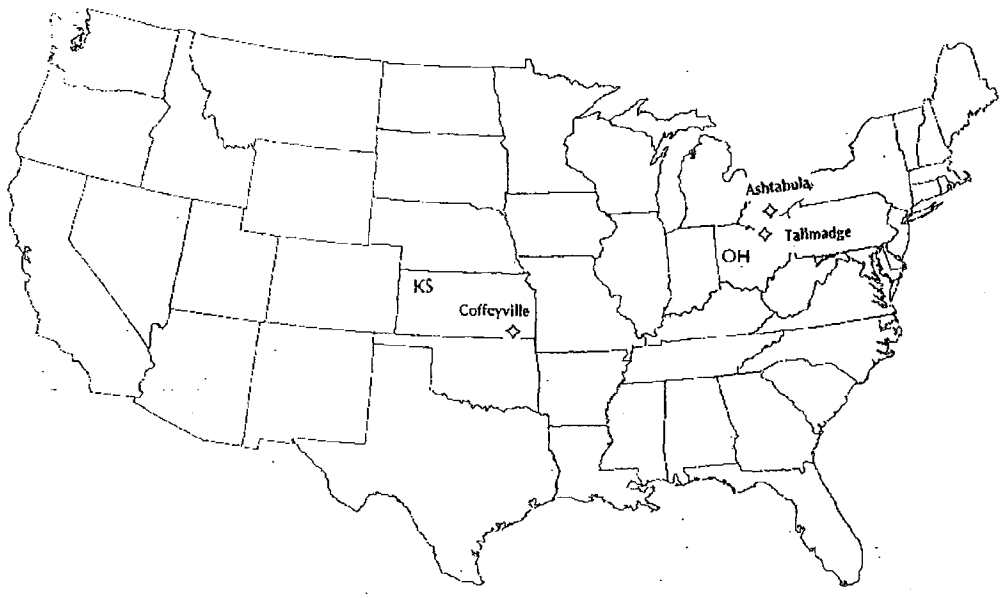


Commercial PCB Disposal Facilities – Fluor. Ballast Recycling



Commercial PCB Disposal Facilities – Physical Separation

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Commercial PCB Disposal Facilities – PCB Trans. Decomm.

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APPENDIX C: COMPANIES COMMENTING ON EPA'S PROPOSED IMPORT/EXPORT RULES

The following companies submitted comments to the EPA regarding the proposed changes to the import/export rules. EPA Docket #66009A contains the full text of these comments.

American Automobile Manufacturers Association

American Trucking Associations

Chemical Waste Management, Inc.

Chemical Manufacturers Association's PCB Panel, National Electric Manufacturers Association, and Utility Solid Waste Activities Group

CINergy

Cintec Environnement, inc.

Comité des Utilisateurs de BCP (CUBPC)

Deere & Company

Department of Defense

Department of Energy

Department of the Army

Department of the Navy

Department of Transportation

ENSR Operations

Environmental Technology Council

EPA Chemical Management Division

EPA Region 10, Pesticides and Toxic Substance Branch

Ford Motor Company

FulCircle Ballast Recyclers

General Electric Company

Hogan and Hartson for Chem-Security, Cintec Environnement, inc., and Bovar Corporation

International Business Machines Corporation (IBM)

Laidlaw Environmental Services Inc.

Lighting Resources, Inc.

Mexico-National Institute of Ecology

S.D. Myers, Inc.

Safety-Kleen

Shipbuilders Council of America

Sola/Hevi-Duti Electric

South Dakota Rural Electric Association

State of Wisconsin-Department of Natural Resources, Bureau of Solid & Hazardous Waste Management

Union Electric Company

Westinghouse Electric Corporation

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