

HAZARDOUS WASTE MANAGEMENT IN ONTARIO: A REPORT AND RECOMMENDATIONS

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EXECUTIVE SUMMARY

This project set out to assemble as complete a picture as possible of the management of hazardous waste, including other forms of 'subject' waste, in Ontario, from publicly available or accessible information sources. The project has its origins in the debates which occurred in the aftermath of the Ontario Environmental Assessment Board's November 1994 decision against the Ontario Waste Management Corporation's (OWMC) proposed comprehensive hazardous waste treatment and disposal facility. The Ministry of the Environment's proposals for major revisions to the province's regulatory framework for hazardous waste management in July 1996 further highlighted the need for a study of this nature.

The review examines the generation, sources, composition and fate of the overall hazardous waste stream from industrial, commercial and institutional sources, and a number of specific waste streams which are sufficiently distinct to warrant individual attention. These include PCB's, Waste Pesticides, Biomedical Wastes, Waste Oil and Household Hazardous Wastes.

The report identifies significant gaps in the available information, and underlying regulatory framework for the protection of public safety, public health and the environment, regarding the generation, handling and fate of hazardous wastes in Ontario. It also concludes that the recent proposals for changes to the regulatory framework made by the provincial government seem likely to widen, rather than narrow these gaps. In some cases, it suggests that their implementation could pose significant risks to public safety and environmental quality.

The report also highlights the degree to which the province of Ontario is falling behind other jurisdictions in this area, particularly in terms of information gathering and public reporting, and the promotion of pollution prevention through hazardous waste reduction. The report notes that other jurisdictions have established producer responsibility requirements regarding household hazardous wastes, integrated their waste generation, transfer and release reporting systems with pollution prevention planning requirements, and applied charges or taxes on hazardous waste generators to promote waste reduction.

Consequently, the report makes comprehensive recommendations for the overhaul and modernization of the province's reporting and regulatory regime for the management of hazardous and other forms of 'subject' waste. These steps are regarded as being necessary to provide an adequate information base for public policy decision-making, ensure the accountability of industry and government, protect the public's safety, health and environment, and promote pollution prevention and hazardous waste reduction.

Recommendations are also made regarding the federal reporting and regulatory regime affecting the management of hazardous wastes in Ontario, particularly with respect to the National Pollutant Release Inventory, and the regulation of interprovincial and international movements of hazardous wastes.

I. INTRODUCTION

This project has its origins in the outcome of the environmental assessment of the

Ontario Waste Management Corporation's (OWMC) proposed hazardous waste treatment and disposal facility. In November 1994, the Environmental Assessment Board accepted the need for additional hazardous waste treatment and disposal capacity in Ontario, but rejected the Corporation's proposed facility on technical grounds.¹ The provincial cabinet rejected an appeal of the Board's decision by the OWMC in February 1995.

The results of the OWMC experience, which had begun with the creation of the Corporation in 1980, highlighted the confusion and lack of comprehensive and reliable information about the management of hazardous wastes in the province of Ontario. This problem was further emphasized in a 1995 Organization for Economic Cooperation and Development (OECD) study on environmental protection in Canada. This document reported that Canadian governments had been able to provide the OECD review team with an estimate of the generation of hazardous waste in Canada.²

The need for an independent and comprehensive review was also emphasized by the Ministry of the Environment and Energy's July 1996 proposals for extensive changes to the regulatory regime for the management of hazardous wastes.³ These proposals, which were presented with little or no supporting data and information, prompted widespread expressions of concern, as they were seen to be likely to significantly weaken the existing regulatory framework.⁴

The situation prompted the Canadian Institute for Environmental Law and Policy (CIELAP) to initiate this study of the management of hazardous and other 'subject' (liquid industrial and registerable solid) wastes in Ontario in the fall of 1996. The project sought to achieve three major goals. First, it was to attempt to generate as complete a picture as possible of the current sources, quantities, composition and fate of the estimated 1.2 - 2.5 million tonnes of what is classified as hazardous wastes generated in the province each year. This was to be done using publicly available or accessible sources of information.

Secondly, it sought to document and assess the current regulatory and policy regime for the management of hazardous wastes in Ontario. This effort was focussed, in particular, on the changes that have occurred since the Institute's last review, completed in 1989,⁵ and on the potential impact of the changes proposed by the province in July 1996.

Third, on the basis of these reviews, the project was intended to identify gaps in both the available data and existing regulatory regime, and present options to address these gaps. The resulting recommendations are focused on three goals. First, they seek to ensure the comprehensiveness, accuracy and availability of data regarding the generation and fate of hazardous and other 'subject' wastes in Ontario to decision-makers and the public at large.

This is essential from the perspective of the public's right to know the quantities, nature and fate of these wastes that are being transported through or generated, processed, treated, or recycled in their communities. The communities that bear the environmental and health risks associated with these activities have a basic right to be informed about them. Public access to this information is also central to the ability of the

public to hold governments to account for the consequences of the public policy decisions that they make.

In addition, improvements in the available data are necessary in terms of the need for adequate information on which to base rational public policy decisions. Furthermore, Canada is required to inventory its generation of hazardous wastes under the *Basel Convention on the Transboundary Movement of Hazardous Wastes*.

Secondly, the recommendations seek to ensure the comprehensiveness and adequacy of the regulatory regime for the management of hazardous and other 'subject' wastes in Ontario. This is to secure the protection of public safety, public health and the environment in the management of these wastes. In order to achieve this goal, the regulatory system should provide that the fates of these wastes are known and under some form of provincial oversight. Adequate standards for the protection of public safety, health and the environment should be in place, including prohibitions on certain treatment and disposal practices where necessary.

Furthermore, Ontario's regulatory regime should not be weaker than that of comparable jurisdictions in Canada and the U.S. This is necessary to prevent the import of wastes seeking disposal options that would not be permitted in their jurisdiction of origin. Indeed, given Ontario's status as Canada's leading generator of hazardous wastes,⁶ the province should be seeking the upward harmonization of its framework with the leading North American jurisdictions.

Third, the recommendations are intended to promote hazardous waste reduction and pollution prevention. This emphasis reflects the degree to which virtually all of the fates of hazardous wastes, once generated, are associated with risks to the environment, and human health and safety. It is also consistent with the government of Canada's July 1995 policy on pollution prevention,⁷ whose key principles were adopted by Ontario through the Canadian Council of Ministers of the Environment in November 1996.⁸ The recommendations seek to link the theme of improving the comprehensiveness, accuracy and accessibility of data with that of pollution prevention and hazardous waste reduction.

The overall direction of the recommendations is also intended to reflect the "Principles for Ontario's Environmental and Natural Resources Policies," articulated by the Ontario Environmental Protection Working Group, in March 1997.⁹

The report is structured in three parts. Part I includes the introduction to the project and its goals, and presents background information on the management of hazardous wastes in Ontario. In particular, Chapter II provides an overview of past and present practices and problems associated with hazardous waste management. Chapter III is a description of the current federal and provincial regulatory requirements that apply to the management of hazardous and other 'subject' wastes in the province. A discussion of recent regulatory and policy developments regarding the management of hazardous wastes at the federal and state levels in the U.S is also provided.

Part II, consisting of Chapters IV-IX presents findings and recommendations regarding the current management of hazardous wastes in Ontario. This information is presented in a series of chapters, beginning with a description of the overall hazardous waste stream from industrial, commercial and institutional sources. This is followed by chapters dealing with a number of waste streams that are sufficiently distinct to warrant individual attention. These include PCB's, pesticides wastes, biomedical wastes, waste oil and household hazardous wastes.

Each chapter describes the available information regarding the generation, composition, sources, and fates of these waste streams in Ontario, recent policy developments regarding their management and fate, and concludes with recommendations to address the gaps in the available data and existing regulatory regime. The chapters dealing with more specific waste streams also include brief discussions of the variations on the basic regulatory structure outlined in Chapter III which sometimes apply to them.

Part III presents overall conclusions regarding the current state of hazardous waste management in Ontario, and the available data sources and the current regulatory regime. It also summarizes the report's proposals for reform.

The data used in this report was the most recent publicly available as of October 1997.

II. HAZARDOUS WASTE MANAGEMENT IN ONTARIO: AN INTRODUCTORY OVERVIEW

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1) Introduction

This chapter provides an overview of how hazardous wastes are defined in Ontario, their sources and composition, potential impacts on the environment and human health, and the ways in which they are managed. This includes discussions of current trends, particularly the move away from the creation of permanent treatment and disposal facilities, and towards hazardous waste reduction at source.

2) Defining Hazardous Waste

Hazardous wastes have generally been defined in terms of their physical and chemical characteristics. Using this approach, they have been broadly described to include those wastes which are toxic, reactive, explosive, ignitable, corrosive, infectious, mutagenic, carcinogenic or teratogenic, bioaccumulative or radioactive.¹⁰ Early attempts at legislative definitions in Canada followed the European model establishing broad categories of materials, such as "hauled liquid industrial waste"¹¹ which required special handling and disposal practices.

More recently, Canadian governments have attempted to follow the American model of developing schedules of specific substances which must be treated as hazardous waste under their environmental protection legislation.¹² Current Ontario and federal government approaches to the definition of hazardous waste are combinations of both models. This has the advantage of capturing both specific hazardous substances, and mixed waste streams whose individual constituents may not be well characterized.

Hazardous wastes are defined for the purposes of this study as non-product output from an industrial, commercial, institutional or residential source which has the potential to cause harm to human health, safety or the environment. This includes wastes meeting the technical, legal federal and Ontario definitions of hazardous wastes, along with other types of wastes, such as liquid industrial wastes, which are subject to the same regulatory requirements in Ontario.¹³

3) Quantities, Sources and Composition of Hazardous Wastes in Ontario

Ontario is by far Canada's largest generator of hazardous wastes, accounting for, by some estimates, nearly 60% of Canada's national total.¹⁴

Hazardous wastes are generated by a wide range of industrial sectors in Ontario. Estimates of the contribution of different sectors, and of the composition of the waste stream vary widely, depending upon the particular definitions, data sources and assumptions used in their development.

A preliminary estimate prepared for Environment Canada identified the leading industrial sources of hazardous waste in Ontario for 1991, the most recent year for which

data are available, as outlined in **Table II-1**¹⁵

Table II-1: Hazardous Waste Generation Selected Sectors: 1991

Sector	Total Waste Generated (tonnes)	Percent of Total
Refined Petroleum and Coal Products	338,648	22%
Paper and Allied Products	254,143	16%
Fabricated Metal Products Industries	203,834	13%
Primary Metals Products Industries	141,528	9%
Transportation Equipment Industry	141,078	9%
Mining Industries	81,339	5%
Chemicals and Chemical Products	79,741	5%
Leather and Allied Products Industries	68,120	4%
Local Government Service Industries	62,990	4%
Other Utility Industries	38,063	2%
Other Service Industries	31,073	2%
Rubber Products Industries	17,691	1%
Transportation Industries	17,390	1%
Health and Social Service Industries	10,772	1%
Electrical Electronic Products Industries	6,398	1%
Total	1,492,808	98%

Wastes can be generated as a result of the production or provision of goods and services, or as a result of non-production activities, such as the clean-up of lands which have been contaminated with hazardous substances in the past.

Estimates of the composition of the Ontario hazardous waste stream also vary widely, depending on the data sources and assumptions used. One estimate developed for Environment Canada in 1995 based on 1991 data is presented in **Table II-2**.¹⁶

Hazardous Waste Generation

Selected Sectors 1991

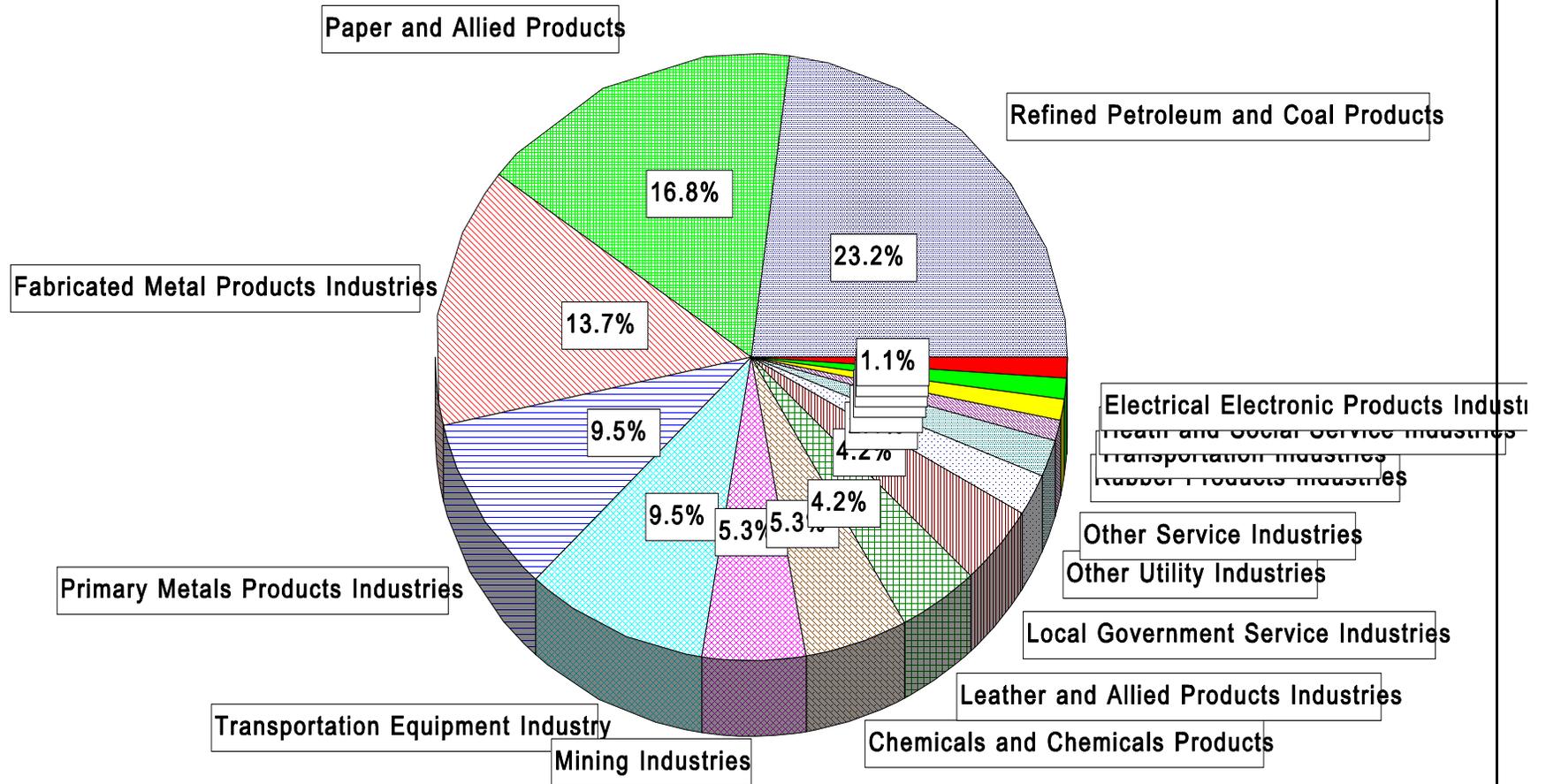


Table II-2: Estimated Composition of Ontario Hazardous Waste Stream - 1991

Waste Stream Element	Quantity (Tonnes)	Percent of total
Heavy Metal Solutions and Residuals	785,474	51%
Sludges and Inorganic Residuals	282,740	18%
Solvents and Organic Solutions	142,442	9%
Anion Complexes	85,758	6%
Clean-up Residuals	69,434	4%
Organic and Oily Residues	67,327	4%
Oils and Greases	32,132	2%
Misc. Chemicals and Products	28,623	2%
Organic Sludges and Still Bottoms	20,785	1%
Paint and Organic Residuals	13,490	1%
Aqueous Solutions with Organics	13,322	1%
Oil/Water Mixtures	2,148	<1%
Pesticides and Herbicide Wastes	1,262	<1%
Total	1,544,937	100%

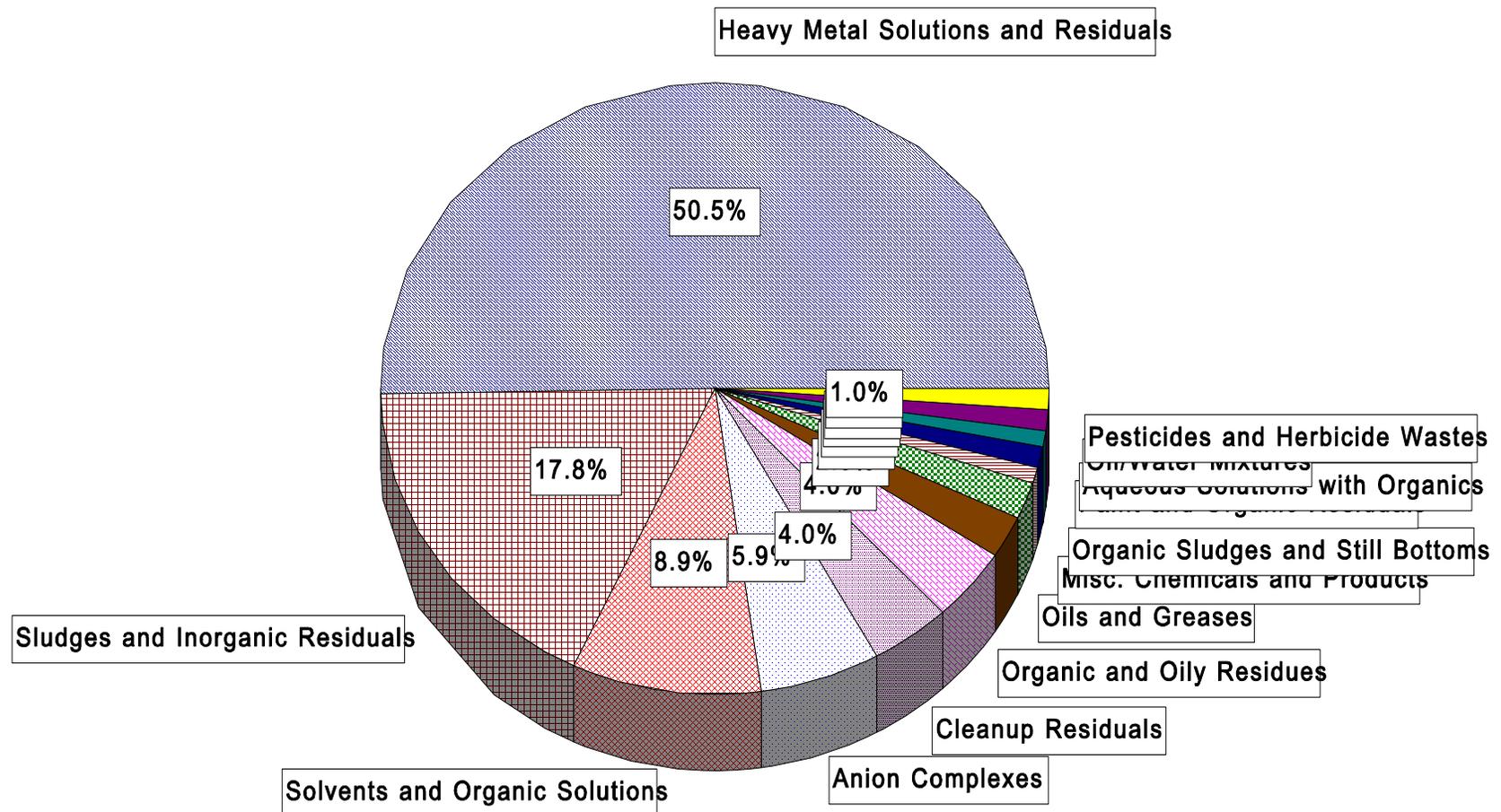
4) Environmental and Health Effects Associated with Hazardous Wastes

The substances and materials constituting the hazardous waste stream in Ontario pose a range of potential threats to the environment and human health and safety. The most obvious problems are related to those wastes which are reactive, explosive, ignitable, corrosive, infectious or radioactive.

In addition, a wide range of components of the waste stream have properties which are harmful to human health or the environment in other ways. A number of waste types have, for example, high metal concentrations. Many heavy metals, such as lead, mercury and cadmium, for example, are classified as "toxic" substances under the *Canadian Environmental Protection Act* (CEPA),¹⁷ known to be acutely toxic in high concentrations, and at lower levels may have deleterious effects on various organs, including the kidneys and central nervous system. Other metals, such as arsenic and chromium, are also classified as CEPA "toxic" and listed as human carcinogens by the International Cancer Research Centre (ICRC).¹⁸

Ontario Hazardous Waste Stream

Estimated Composition (1991)



A number of organic compounds frequently found in industrial waste streams are also on the ICRC list of human carcinogens including chloroform, tetrachloroethylene, carbon tetrachloride, and benzene.¹⁹ Several of these substances are classified as "toxic" for the purposes of CEPA as well.²⁰ In addition, many organics found in industrial waste streams can have deleterious effects which are not carcinogenic. Immune system dysfunctions can be caused by formaldehyde, toluene, phenol, polycyclic aromatic hydrocarbons (PAH), pentachlorophenol (PCP) and tetrachloride-benzo-p-dioxins (TCDD). Toluene also can affect adversely the nervous system and cause bone marrow damage. Chloracne, an especially severe form of acne, can be caused by exposure to chlorinated hydrocarbons, such as PCBs and dioxins.²¹ A number of persistent organic pollutants have also been implicated as endocrine disrupting substances.²² Exposure to some insecticide residues may cause damage to the nervous system, liver and reproductive systems.²³

Contaminated Sites

The improper management of hazardous wastes in the past has left a significant legacy in the form of contaminated sites in Ontario and across Canada. Such sites cannot be put to new uses until they are remediated and, in some cases, pose direct threats to ground and surface waters, and the health of human beings living near them. The remediation of such sites is often expensive, and results in the generation of significant quantities of hazardous wastes which themselves require disposal.²⁴ The remediation of a former PCB transfer station in Smithville, Ontario for example has cost more than \$50 million to date.²⁵

There is no complete inventory of contaminated sites in Canada, or reliable estimate of the number of sites which exist. The Auditor-General of Canada has estimated that there are at least 5,000 contaminated sites on federal lands alone,²⁶ with an estimated clean-up cost of up more than \$2 billion.²⁷ Estimates of the total cost of remediating all sites across Canada, based on experience in the U.S. and elsewhere, range from \$20 to \$75 billion, excluding sites contaminated with radioactive materials.²⁸

5) Approaches to the Management of Hazardous Waste in Ontario

i) On and Off-Site Management

Hazardous wastes are disposed of by Ontario industry in a number of different ways. Wastes may be dealt with on the site of their generation, through discharges to municipal sewer systems, discharges to surface waters (usually following some form of treatment), incineration, landfilling, and volatilization. Many of these practices are associated with significant environmental problems. Disposing of hazardous wastes into municipal sewer systems, which is, by some estimates, their most common fate in Ontario, for example, can pose a serious occupational health and safety problem for plant staff, interfere with the regular operation of facilities, result in toxic discharges from sewage treatment plants, and the contamination of sewage sludge.²⁹

Table II-3 : Toxic and Carcinogenic substances on the NPRI list (1994)

Substance Name	Total Releases³⁰ (tonnes)	Transferred Off Site³¹ (tonnes)	Total Release & Transfer (tonnes)
Bis (2-ethylhexyl) phthalate	92.804	N/A ³²	>/=92.804
Lead (and its compounds)	2142.22	1301.65	3443.87
Chromium (and its compounds)	800.859	1002.646	1803.505
Asbestos	352.184	935.063	1287.247
Nickel (and its compounds)	704.496	506.918	1211.414
Styrene	1792.518	310.694	2103.212
Formaldehyde	1116.417	212.451	1328.868
Benzene	2675.468	151.589	2827.057
1,3-Butadiene	310.18	131.311	441.491
Tetrachloroethylene	163.335	93.929	257.264
Dichloromethane	2222.089	35.309	2257.398
Mercury (and its compounds)	3.806	32.633	36.439
Arsenic (and its compounds)	3980.656	29.117	4009.773
Trichloroethylene	859.483	27.228	886.711
Acrylonitrile	19.556	18.93	38.486
Carbon tetrachloride	18.135	11.107	29.242
Propylenene oxide	11.071	2.906	13.977
Acrylamide	5.878	2.845	8.723
Toluenediisocyanate (mixed isomers)	1.033	2.691	3.724
Cadmium (and its compounds)	96.041	2.484	98.525
Toluene-2,4-diisocyanate	0.148	1.59	1.738
Vinyl Chloride	23.725	0.957	24.682
Ethylene oxide	51.067	0.877	51.944
Nitrilotriacetic acid	1.001	0.549	1.55
p-Dichlorobenzene	10.4	0.5	10.9
1,2-Dichloroethane	7.579	0.22	7.799
Choloroform	0.172	0.008	0.18
Acetaldehyde	133.287	0.001	133.288
Total Release / Transfer	17595.608	4816.203	22411.811

Hazardous wastes may also be shipped off the site of generation for treatment and disposal. Wastes dealt with this way may be landfilled, incinerated, burned as fuel, subject to some form of physical, chemical or biological treatment to reduce their toxicity, or disposed of through underground injection. A significant portion of wastes shipped off-site are also recycled for other uses. Substantial amounts of wastes are imported into Ontario for disposal or 'recycling' from other provinces and the United States, and exported to these destinations from Ontario for the same purposes.

ii) **Recycling, Treatment and Disposal Methods**

There are a number of treatment and disposal technologies available for dealing with hazardous wastes, both on- and off the site of their generation. These techniques include incineration, physical/chemical and biological treatments, solidification, secure landfilling, and disposal through underground injection. Although all of these approaches offer opportunities to reduce the toxicity and volume of wastes requiring disposal, all suffer from a number of drawbacks, and have been the source of considerable controversy with respect to their effectiveness, the products which they produce, and their impacts on human health and the environment.

Recycling

A significant portion of the hazardous waste stream is recycled or reused. In some cases materials are reused or recycled within the operations of the facility generating the waste. In other instances, wastes are shipped off-site for reuse, recycling or reprocessing. These activities may result in the recovery of waste components with significant economic value. However, they also often are associated with significant problems and risks. These include the possibility of spills or accidents during the transportation of wastes to recycling sites, and fires or spills at recycling facilities,³³ and occupational health and safety risks associated with the handling of materials which are by definition hazardous. These risks are compounded by the fact that wastes sent for recycling may contain unknown contaminants which may affect the recycling process in unexpected ways.³⁴

In addition, recycling activities may result in the release of hazardous pollutants into the air and water, and result in the production of residuals which are hazardous wastes themselves and require disposal.³⁵ In Ontario, there is also a long history of the illegal disposal of hazardous waste, causing substantial harm to the environment, under the guise of "recycling."³⁶

Incineration

High temperature incineration has come to be widely regarded as a technologically feasible method of dealing with organic wastes. This would include those compounds based on carbon rings or chains and which will, therefore, burn. Incineration can greatly reduce both the toxicity and volume of the wastes in question. Although a number of designs have been employed in the past, the rotary kiln type of incinerator has emerged as the most important component of many European hazardous waste treatment plants and

was selected by the OWMC for use in its proposed facility.

However, a number of concerns have been raised with respect to the use of this technology as a means in dealing with hazardous wastes. Questions were posed, for example, regarding the nature and impact of the stack emissions, including heavy metals, persistent organic pollutants, carbon monoxide, hydrogen chloride, sulphur dioxide, and nitrogen oxides, which would occur from the operation of incinerators at the OWMC proposed facility.³⁷ The North American Commission for Environmental Cooperation has also highlighted the role of hazardous waste incinerators as sources of emissions of persistent organic pollutants, heavy metals, and particulate matter.³⁸

Serious issues also arose in the course of the OWMC environmental assessment regarding the disposal of bottom and fly ash from the incinerators, which would be contaminated with a range of hazardous substances, particularly chlorides.³⁹ Indeed, the OWMC's proposal to landfill this ash was a major factor in the Environmental Assessment Board's decision against its proposal.

In addition, rotary kilns are required to be run at high temperature with a minimum number of shutdowns. This implies that they may have a significant lock-in effect in terms of their need to be supported by a steady supply of waste for fuel, which may therefore limit the opportunities for industrial waste reduction, reuse and recycling.

Physical/Chemical Treatment

Many waste streams require the concentration, precipitation, and chemical degradation of toxic materials before final disposal through landfilling or other means. Acidic waste, for example, is generally neutralized before incineration. Physical-chemical treatment processes inactivate and precipitate certain compounds from solution so that the effluent waste can be disposed in a non-toxic form and the chemicals recovered or treated. Treatments include neutralization, oxidization, reduction, precipitation, flocculation, dewatering, and polishing of the effluent through use of ion exchange or activated carbon. Examples of waste that can be handled by these processes include dissolved waste or solids in suspension, including heavy metals, toxic organics, and dissolved or emulsified oils and solvents. A combination of treatments is usually necessary. Cyanide waste, for example, may be oxidized to an inert form before precipitation. Physical-chemical treatments are most effective when the waste streams in question are of specific compositions.⁴⁰

The major disadvantage of conventional physical-chemical treatment processes is that they often produce large volumes of sludges which are themselves hazardous wastes. These must eventually be disposed of in some way as well.

Solidification

A number of processes have been developed for solidifying liquid and semi-solid materials into forms resistant to leaching or deterioration in a landfill. Solidification processes are employed at the Stablex facility in Quebec, the Alberta Special Waste Management Corporation (ASWMC) Facility at Swan Hills, and was the method by which

the OWMC proposed to deal with the ash from its incinerators.⁴¹ These processes involve encapsulating waste with materials such as asphalt, tar, polyolefins, and epoxies, or with inorganic materials such as portland cement, lime-based mortars, lime-flyash mix, or with a mixed system involving both inorganic and organic materials.⁴²

Secure Landfill

Landfill remains the ultimate resting place for the waste products of other treatment methods, including incinerator ash and sludges from physical-chemical treatment processes. Given the inability of ordinary sanitary landfills to contain hazardous wastes, attempts have been made to design what are termed "secure" landfills. Such facilities, are employed extensively in Europe, by the ASWMC, and were proposed by the OWMC. They are usually located on sites chosen for their natural clay deposits, and are often enhanced with an additional clay liner. An underdrain system is normally constructed to capture any liquid leaching through the landfill, which is then pumped to the surface for treatment. Wastes are buried in cells, which are then covered with clay and planted over with vegetation to minimize the intrusion of precipitation. Monitoring wells are employed to determine if wastes are migrating from the disposal cells.⁴³

However, "secure" landfills have been known to fail in a number of ways. In fact, the United States Congress Office of Technology Assessment has noted that all known hazardous waste landfills in that country leak, including those constructed utilizing "secure" design principles.⁴⁴ Similarly, the problem of chloride leachate escaping the proposed OWMC's landfill facility was a major factor in the Joint Board's decision against the Corporation.⁴⁵ Leachate collection systems may break down because drainage layers or collection pipes become clogged, or due to the weight of overlying wastes and soils crushing collection pipes. Collection pumps may also fail. Cover caps can crack due to settling, erosion, freeze-thaw cycles and drying out. In addition, plant and tree roots and burrowing animals and insects can penetrate the cap layer of the landfill.⁴⁶

A number of alternatives to conventional "secure" landfilling do exist, including various forms of above ground storage including the use of concrete bunkers and warehousing.⁴⁷ Although these approaches may offer a higher level of protection, they have been generally rejected by proponents of treatment and disposal facilities on the basis of cost.⁴⁸

Disposal Facility Siting

The problems associated with current disposal methods for hazardous waste have made it very difficult to establish locations for new treatment and disposal facilities. Communities selected as potential hosts typically resist their selection on the grounds of their likely impacts on human health and the environment, and question the fairness of their community having to bear the environmental costs of economic activities from which society as a whole has benefitted. In Canada and the United States, potential host communities have significant political and legal means by which they can oppose hazardous waste facility siting decisions. In fact, it seems virtually impossible to site a new permanent hazardous waste disposal facility in the face of determined community opposition.⁴⁹

6) The Shift from Treatment and Disposal to Hazardous Waste Reduction and Pollution Prevention

i) Early Policy Responses: Seeking New Treatment and Disposal Capacity

Much of the initial response of Canadian governments, including Ontario's, to the emergence of serious environmental problems related to hazardous waste management in the late 1970's⁵⁰ was to focus on the establishment of comprehensive hazardous treatment and disposal plants, incorporating incineration, physical/chemical treatment, and secure landfill facilities for such wastes. In the absence of acceptable private sector proposals, Crown corporations, including the OWMC, were established to provide such plants. Considerable effort was put into finding acceptable locations for such facilities, as they frequently faced intense opposition from potential host communities.

A comprehensive treatment and disposal facility was eventually established at Swan Hills, Alberta, operated by the ASWMC in 1987. The plant was originally a joint venture between ASWMC, a crown corporation of the province of Alberta, and a private sector partner. However, the province divested its stake in the facility in 1995.⁵¹ The Manitoba Hazardous Waste Management Corporation, another Crown Corporation, opened a physical/chemical treatment facility in 1991.

A number of other proposals for new treatment and disposal facilities, of the past few years, have either been rejected by regulatory bodies or withdrawn by their proponents. These include the OWMC's facility in southern Ontario, rejected by the Ontario Environmental Assessment Board in November 1994, and a new rotary kiln proposed by Laidlaw Environmental Services for Sarnia, Ontario, which was withdrawn by its proponent in October 1993.

These more recent developments reflect the growing questions within Canada, and elsewhere, regarding the usefulness of permanent, large-scale hazardous waste treatment and disposal facilities such as that proposed by the OWMC. This debate is fueled by a number of factors.

ii) New Paradigms: Hazardous Waste Reduction/Pollution Prevention

First, in the absence of any significant regulatory initiatives related to hazardous waste management over the past decade, there has been little demand for better disposal options. In fact, many commentators have noted a significant overcapacity in disposal facilities in North America.⁵² Second, where disposal capacity is needed to deal with contaminated sites or existing pollutants, there is an increasing trend towards the use of temporary, mobile facilities to destroy wastes on-site. The mobile PCB destruction technology developed by ECO-Logic Inc.,⁵³ is a significant example of such a technology.

The use of temporary, mobile facilities also avoids much of the conflict with host communities associated with the development of permanent facilities intended to deal with wastes generated outside of the community. In addition, the destruction of wastes on site eliminates the risks of spills or other accidents associated with its transportation to a

centralized disposal facility.

Third, and perhaps most significantly, there is an increasing recognition of the limitations of the traditional "pollution control" approach to environmental protection. Hazardous waste treatment and disposal plants have come to be seen as extensions of that model. The conventional approach has accepted the generation of pollutants as a given, and then sought to control their environmental effects through the addition of end-of-process pollution control systems.

Growing experience suggests that this approach is highly inefficient and of limited environmental effectiveness. End of pipe pollution control systems often have the effect of simply transferring pollutants between media, rather than eliminating the problem.⁵⁴ These results have led to a growing emphasis on preventing pollution through the reduction of hazardous waste generation at source. This may be achieved in a number of ways, including input substitutions and changes in industrial processes. The adoption of these new technologies often not only result in reductions in pollution and the need for treatment and disposal facilities, but also in improved production processes, which make more efficient use of energy and raw materials.⁵⁵

iii) Barriers to Hazardous Waste Reduction/Pollution Prevention

A number of significant barriers have been identified to the development pollution prevention and hazardous waste reduction technologies throughout the economy. Among the most significant of these is the limited availability of capital both to support the development of pollution prevention technologies, and to fund the actual adoption of such technologies. These economic barriers tend to be particularly significant in the case of small and medium-sized firms, as their capital and in-house research and development resources are typically very limited to begin with.⁵⁶

In addition, the potential for pollution prevention or waste reduction, reuse or recycling approaches to pay for themselves through reduced material and energy use, particularly in comparison with the costs of achieving the same result through the use of end-of-pipe systems, has not been fully accepted.⁵⁷ Indeed, conventional economic analyses tend to assume that any cost-effective process-change opportunities already will have been taken by the firm in question.⁵⁸

In some cases, appropriate technologies, or substitute inputs may not be immediately available, requiring investments in research and development. Firm managers also may be reluctant to invest in the adoption of a particular technology due to concerns that it may not perform as well as expected, leaving the firm both economically weakened, and unable to meet the environmental standards which the technology was intended to address.⁵⁹

Beyond these economic, attitudinal, and technological barriers, the structure of environmental regulations themselves can present barriers to the development and adoption of pollution prevention and resource-conserving technologies. Environmental protection requirements which remain static, which are not effectively enforced, or which actually are reduced, clearly provide no incentives for innovation and upgrading.⁶⁰ In fact, there is a strong consensus among those who study the emergence of new environmental technologies that *stringent and certain* regulatory demands,⁶¹ supported by expectations of firm, predictable and targeted enforcement,⁶² are essential to prompting the development and adoption of pollution prevention and resource conserving technologies. This is a particularly significant consideration given the virtual absence of any significant regulatory initiatives in the area of hazardous waste management by Canadian governments over the past few years.

iv) Hazardous Waste Reduction/Pollution Prevention in Ontario Hazardous Waste Policy

The promotion of hazardous waste reduction, reuse, recycling and "recovery" was first officially adopted as Ontario government policy in 1983, through the Blueprint for Waste Management in Ontario. More recently, pollution prevention was identified as the preferred approach under the province's Municipal Industrial Strategy for Abatement (MISA) program to control industrial discharges to surface waters in 1991.

At the federal level, a Pollution Prevention Strategic Framework was adopted in July 1995. Defines pollution prevention as:

"the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health or the environment."⁶³

However, to date Canadian governments have relied almost exclusively on voluntary efforts by industry to promote pollution prevention and hazardous waste reduction activities within industry. In contrast, many U.S. states have adopted pollution prevention planning or toxic use substances reduction laws intended to reduce the production of pollution and hazardous wastes. These programs are often delivered in combination with extensive

technical assistance programs.⁶⁴

A number of western European nations including West Germany, Denmark and Finland have pursued industrial waste reduction as an integral component of industrial policy since the early 1980's.⁶⁵ This is consistent with the direction outlined by the Brundtland Commission in its 1987 report Our Common Future,⁶⁶ and the Agenda 21 document subsequently adopted at the United Nations Conference on Environment and Development in 1992.

7) Conclusions

Hazardous wastes are defined in a number of different ways in Canada and Ontario. Both the federal and Ontario governments use combinations of specific characteristics of wastes, such as reactivity, explosiveness and flammability, and lists of particular substances to define what is, and is regulated as, hazardous waste.

Hazardous wastes are defined for the purposes of this study as non-product output from an industrial, commercial, institutional or residential source which has the potential to cause harm to human health, safety or the environment. This includes wastes meeting the technical, legal federal and Ontario definitions of hazardous wastes, along with other types of wastes, such as liquid industrial wastes, which are subject to the same regulatory requirements in Ontario.

Estimates of hazardous waste generation in Ontario vary widely, and the most recently available figures are based on 1991 data. Information on the sources and composition of the waste stream is also limited, and for the most part, is again over five years old. The primary and fabricated metals industries are generally identified as Ontario's largest generators of hazardous wastes, and heavy metal solutions and residuals are considered to make up the largest portion of the hazardous waste stream.

Wastes are managed both on and off the site of their generation, including disposal into municipal sewage treatment plants, surface waters, incineration, landfilling, and various forms of physical, chemical or biological treatment. Almost all current on and off-site disposal practices are associated with significant environmental impacts. A major portion of the hazardous waste stream is, according to some reports, recycled or reused. However, many types of hazardous waste recycling or reclamation facilities are themselves associated with substantial environmental effects, and produce residues or sludges which must themselves be disposed of as hazardous wastes.

The initial focus of Ontario public policy towards hazardous waste management was on the establishment of comprehensive central treatment and disposal facilities such as that proposed by the OWMC. However, more recently, there has been a growing emphasis on the use of temporary, mobile treatment and disposal technologies.

Even more importantly, there has been a significant shift in thinking away from end-of-process treatment and disposal of hazardous waste, towards hazardous waste reduction

and pollution prevention. This reflects the degree to which virtually all of the management options for hazardous wastes, including recycling, are associated with significant environmental, health and safety impacts. Pollution prevention and waste reduction efforts often also result in substantial savings to the waste generator, both in terms of disposal costs and resource use.

Although the Ontario and federal governments have adopted hazardous waste reduction through pollution prevention as their preferred approach to hazardous waste management, they have relied almost exclusively on voluntary measures by industry to implement this approach. This is in contrast to the approach taken in the U.S., where toxics use reduction and mandatory pollution planning legislation have been adopted in a large number of states, in combination with strong requirements regarding the reporting of the generation, storage and release of pollutants into the environment to the public.

III. THE LEGAL, REGULATORY AND POLICY FRAMEWORK FOR HAZARDOUS WASTE MANAGEMENT IN ONTARIO

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1) Introduction

Both the federal and provincial governments play a role in the regulation of the management and disposal of hazardous wastes. The province is the primary regulator, although federal government has important functions in the regulation of the interprovincial and international import and export of wastes, hazardous waste management on federal lands and in the establishment of the National Pollutant Release Inventory. Both the provincial and federal governments have initiated a number of programs intended to promote pollution prevention and hazardous waste reduction.

2) Federal

i) Transboundary Waste Movements

The principal federal role with respect to the management of hazardous waste is centred upon their interprovincial and international movement. The *Canadian Environmental Protection Act* (CEPA) provides Environment Canada the authority to set conditions governing the export and import of hazardous wastes for the purposes of disposal and recycling and to require that notice be given to Canadian authorities before hazardous wastes are exported from or imported into Canada. Hazardous wastes are defined for the purposes of CEPA as any dangerous goods, as defined under the *Transportation of Dangerous Goods Act* that are a waste, or any substance specified on the List of Hazardous Wastes requiring Export or Import Notification made under CEPA.⁶⁷ This list currently includes over 100 waste types.⁶⁸

The *Export and Import of Hazardous Wastes Regulations*, made under CEPA in 1992, require that a prior notification be submitted when someone intends to export or import a hazardous waste and that the receiving jurisdiction (country or province) declare that it consents to the import of the shipment of hazardous wastes, that a waste manifest describing the waste accompany the shipment at all times, that the exporter/importer carry insurance to cover any damages to third parties for which the exporter or importer is responsible, and to cover environmental damage due to spills leaks or other incidents during export or import, and that Canadian exporters accept the return of wastes which are refused by the importer. In the case of imports, consent must be obtained by the Canadian importer, through Environment Canada, from the receiving province.

CEPA also requires that when the Minister of the Environment receives a notice of the proposed export or import of a hazardous waste, he or she is required to publish a notice in the *Canada Gazette*, or in another appropriate manner, the name or specification of the toxic substance or hazardous waste, the name of the exporter or importer, and the country of destination or origin.⁶⁹ This is usually accomplished through *Resilog*, a newsletter published by Environment Canada.

The CEPA regulations are intended to implement Canada's obligations under the three international agreements on hazardous waste movements to which Canada is a party. The first is the 1986 *Canada-United States Agreement on the Transboundary Movement of Hazardous Waste*. The United States is Canada's largest partner for exports

and imports of hazardous waste. The second is the *Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal*.

Canada signed the Basel Convention in 1989, and ratified it, through the adoption of the CEPA transboundary waste movement regulations, in August 1992. The Convention establishes requirements for prior informed consent of the receiving party prior to the export of wastes for disposal or recycling. The Convention also includes a ban on exports of hazardous wastes to non-parties, or the import of wastes from non-parties, unless there is an agreement between the two countries. The 1986 Canada-U.S. Agreement permits transboundary waste movements between Canada and the U.S., which is not a party to the Basel Convention.⁷⁰

At the March 1994 Conference of the Parties to the Basel Convention, it was agreed to amend the Convention to ban immediately exports of hazardous wastes from developed⁷¹ to developing countries for disposal. Furthermore, at the September 1995 Conference of the Parties, the Basel Convention was amended to ban the export of hazardous wastes for disposal, recycling or recovery from developed to developing countries as of January 1, 1998. Canada has yet to ratify these amendments.

Finally, in March 1992, Canada adopted, along with other members of the OECD, the OECD Decision of the Council Concerning the Control of Transfrontier Movements of Wastes Destined for Recycling Operations.⁷² This provides for the establishment of controls on movements of recyclable wastes among OECD members.⁷³ The decision creates a tiered system of controls based on risk criteria. Written consent from receiving authorities is required for movements of red-listed wastes; tacit consent from receiving authorities is assumed following notification if no objections are raised for "amber" listed wastes; and "commercial" controls for "green" listed waste that do not exhibit a hazard characteristic.⁷⁴

ii) PCB Storage, Export and Disposal

In addition to the regulations governing transboundary waste movements, regulations have been made under CEPA establishing requirements for PCB storage sites,⁷⁵ the treatment and destruction of federally owned PCB's,⁷⁶ and prohibiting the export of PCB wastes to any country other than the United States.⁷⁷ These provisions are described in detail in the Chapter of this report dealing with PCB wastes.

iii) Ozone Depleting Substances

A series of regulations dealing with ozone depleting substances was adopted under CEPA between 1990 and 1993.⁷⁸ These ban food packaging material made of plastic foam in which chloroflourocarbons (CFC's) have been used as a foaming agent, pressurized CFC containers of ten kilograms or less, and control the production and import of CFC's, halons, methyl chloroform and carbon tetrachloride. The regulations require producers to complete quarterly reports on their production, imports and exports of controlled substances.⁷⁹ However, the regulations are silent on the issue of the disposal of ozone depleting substances. This may reflect the consideration that no technology currently exists

to destroy CFC's and other ozone depleting substances.⁸⁰

iv) Hazardous Waste Management within Federal Agencies, Works and Lands

CEPA also provides authority for the establishment of regulations dealing with environmental protection on federal lands, and the operations and activities of federal government agencies.⁸¹ The only regulations which have been established to date using this authority are those dealing with the treatment and destruction of federally- owned PCB's. Environment Canada has proposed to develop additional regulations regarding the management of hazardous wastes at federal facilities.⁸² However, these regulations have been delayed, apparently due to resistance from the other federal departments which they would affect.⁸³

v) National Pollutant Release Inventory

Waste generators are required to report their releases or transfers off-site of 178 designated substances to Environment Canada under the National Pollutant Release Inventory (NPRI) Program.⁸⁴ Facilities that manufacture, process or "otherwise use" less than 10 tonnes of a substance in a given year are exempt from reporting requirements, as are those who have less than 10 full-time employees. The data are then made available to the public. In 1993, the first reporting year, generators were also required to report shipments of NPRI substances off-site for recycling or reuse. However, for reasons which have never been clear, this requirement was made voluntary for the 1994 and subsequent reporting years. This resulted in a significant gap in the NPRI data, as in the 1994 NPRI data 'recycling' accounted for the fate of more NPRI substances than total releases to the air, land, water, and underground injection, and transfers off-site for disposal combined.⁸⁵

The NPRI includes a number of other significant exemptions. Facilities involved in the distribution, storage or retail sale of fuels, research and testing of NPRI substances, educational activities, the sale of products containing NPRI substances, the growing, harvesting and management of renewable resources (fisheries, forestry and agriculture), mining and the drilling and operation of oil and gas wells, are exempt for NPRI reporting requirements.⁸⁶

vi) The Federal Fisheries Act

The federal Fisheries Act prohibits persons from depositing, or permitting the deposit of deleterious substances into waters frequented by fish, unless the deposits are of a type, quality or concentration authorized by regulation. This effectively prohibits discharges of hazardous wastes into waters frequented by fish, except where authorized by such regulations. Regulations establishing standards for discharges from six industrial sectors were promulgated under the Act between 1971 and 1977. The regulation dealing with the pulp and paper sector was updated and strengthened in 1992.⁸⁷

3) Provincial

ii) Regulation 347 and 'Subject' Waste

Ontario's legal, regulatory and policy framework for hazardous waste management has its origins in the Waste Management Act of 1970. This Act established, for the first time, a requirement that anyone wishing to establish a waste disposal site obtain an approval from the province.⁸⁸ In the case of hauled liquid industrial and hazardous waste collection and disposal services, the Act allowed for the control of waste management systems, which were defined to include the collection and transportation of waste, as well as its treatment and disposal.⁸⁹ The Act's passage was accompanied by the promulgation of a regulation defining hazardous wastes as those which were "explosive, flammable, volatile, radioactive, toxic and pathological" and providing for the oversight of the transfer of liquid industrial wastes from the point of their generation to sewage treatment plants.⁹⁰

The provisions of the Waste Management Act were incorporated into the Environmental Protection Act in 1971. Under Part V of the Act, a proponent wishing to establish a transfer station, processing facility or disposal site for hauled liquid industrial wastes or hazardous wastes is required to obtain a Certificate of Approval from the Ministry. A public hearing before the Environmental Assessment Board is required prior to the granting of an approval for a liquid industrial or hazardous waste disposal site.

However, as a result of a regulation adopted in 1993, public hearings are now only required for disposal sites landfilling or incinerating waste.⁹¹ This means that disposal sites employing physical, chemical or biological means to dispose of wastes, or sites disposing of wastes by burning them as 'fuel' are normally exempt from public hearing requirements prior to approval by the Ministry.

An environmental assessment of a proposed system or site under the Environmental Assessment Act would be required if the proponent is a public sector

agency, unless exempted by regulation, as was originally the case with the OWMC.⁹² Private sector proposals may be designated by regulation as being subject to the Act. This typically has been done with proposed commercial operations, such as the expansion of Laidlaw Environmental Services's incineration and landfill facility in Sarnia.

As a result of Regulation 207/97, adopted in May 1997, proposed waste disposal facilities, including landfill or incineration sites, that are designated for review under the *Environmental Assessment Act*, are exempted from the requirement for a public hearing before the Environmental Assessment Board under Part V of the Environmental Protection Act, if the Minister chooses not to require a public hearing under the *Environmental Assessment Act*.

'Waybilling' and 'Manifesting' Shipments of Wastes Off-Site, and Generator Registration

In 1976 a schedule of specific substances considered to be "hazardous wastes" was adopted by the province. In addition, a "waybilling" system was established for transfers off-site of "hauled liquid industrial waste".⁹³ This system was greatly expanded to its current requirements in 1985, following a long period of controversy regarding the management of hazardous and liquid industrial wastes in the province.⁹⁴

The 1985 amendments to what is now Regulation 347 imposed a requirement that all generators of liquid industrial and hazardous wastes register with the Ministry of the Environment, and expanded the manifest system to track all movements of liquid industrial and hazardous waste from the generator to a disposal facility.⁹⁵ These wastes are classified as "subject waste" for the purposes of the generator registration and manifesting requirements. Generators of registerable solid wastes, defined as wastes which generate leachate between 10 and 100 times concentrations set out in the Regulation were also required to register. The Ministry of the Environment estimates that there are approximately 30,000 registered generating sites of subject waste which either generate or dispose of 'subject' wastes in Ontario.⁹⁶

Liquid industrial waste is defined for this purpose as waste that is both liquid and industrial. Hazardous waste is defined to be one or a mixture of: hazardous industrial waste (listed in Schedule 1 of the Regulation); acute hazardous waste chemicals (listed in Part A of Schedule 2); hazardous waste chemicals (listed Part B of Schedule 2); severely toxic wastes (listed in Schedule 3); ignitable waste; corrosive waste; reactive waste; radioactive waste; pathological (biomedical) waste; leachate toxic waste; and PCB waste as defined in Regulation 362.⁹⁷

Exemptions from the category of subject waste include: hauled sewage; waste from the operation of municipally or crown owned sewage treatment plants that receive only waste similar to domestic sewage; domestic (household) waste; incinerator ash, other than fly-ash, from the incineration of non-hazardous waste; industrial hazardous, hazardous waste chemicals, ignitable, corrosive, leachate toxic, or reactive, as defined by Regulation 347 of which less than 5kg per month is produced or otherwise accumulated, containers for such wastes, and residues from the clean-up of spills of less than 5kg of such wastes; acute hazardous waste chemicals of which less than 1 kg a

month is produce or accumulated, containers of less than 20 litres of such wastes, and residues from clean-ups of spills of less than 1 kg of such wastes.

Section 18 of regulation 347 requires that generators of subject waste submit an initial generator registration report to the Ministry. A generator is then issued a generator registration number and a waste number for each waste registered. This is to be updated if there are changes in the information about the generator, any additional waste types and any "significant change in the description or physical or chemical characteristics" of a previously registered waste.⁹⁸ A generator is forbidden to ship any subject waste off-site for disposal or recycling without being registered.⁹⁹ Subject waste may only be stored on site by a generator for three months without being reported to the Ministry.¹⁰⁰

Where waste is shipped off the site of its generation for disposal or recycling, sections 19-27 of Regulation 347 require the completion of a waste manifest for each waste shipment. Waste carriers are issued books of six-part manifest forms that contain parts to be filled out by the carrier, the generator, and the receiver. The carrier is required to fill out section B of the form and then give it to the generator, who fills in section A. The generator then retains two copies, filing one with the Ministry and keeping one for two years. The carrier takes the remaining four copies with the shipment and, upon reaching the destination, gives them to the receiver. The receiver must then complete section C of the form, keep three copies and return one to the carrier. Of those three copies, one is filed with the Ministry, which can then verify it against the copy originally filed by the generator, one is returned to the generator, which is responsible for ensuring that the waste went where it was supposed to, and one is retained by the receiver for two years.¹⁰¹

The Ministry of the Environment estimates that there are currently 1,200 certified carriers and 400 certified receivers of subject waste in Ontario. The province uses approximately 150,000 manifests annually.¹⁰²

Transboundary Movements

There are variations to accommodate the transport of hazardous waste into, out of, and through Ontario, but the basic tracking system is the same.¹⁰³ In the case of transboundary movement of waste, the provisions of CEPA and the federal transportation of Dangerous Goods Act¹⁰⁴ apply. With respect to manifesting, the Ontario and federal regimes have been designed to harmonize,¹⁰⁵ however, the two systems do not overlap entirely in terms of the range of substances for which manifesting is required. The Ontario system requires, for example, manifesting of "liquid industrial wastes" and "registerable solid wastes" which are not covered under the federal regulations. The federal regulations, on the other hand, require manifesting for "corrosive solid wastes," which are not covered by Ontario Regulation 347.

The relationship between federal and provincial regulations is particularly complex regarding the definition of "recyclable materials." As is described below, certain types of 'recycling' activities are exempted from the Ontario Regulation 347 manifesting requirements. However, manifesting would still be required under federal regulations made under CEPA for materials to which those regulations apply.

Exemptions from Generator Registration and Waste Manifesting Requirements

There are a number of significant exemptions from these requirements. The burning of liquid industrial wastes as fuel on the site of their generation does not require a Certificate of Approval provided that not more than ten tonnes is burned per day.¹⁰⁶ Waste derived fuel is defined in this context as waste having a quality of fuel "not worse than commercially available low grade fuel," and which contains not more than prescribed concentrations of arsenic (5mg/kg), cadmium (2mg/kg), chromium (10mg/kg), lead (50mg/kg), PCB's (2mg/kg) and total halogens (1,500mg/kg).¹⁰⁷ Sites in operation before September 1992 are also exempted from the requirement to obtain a Certificate of Approval.¹⁰⁸

Regulations have also been adopted exempting depots for the collection of lubricating oil, transmission and hydraulic fluid, oil filters and anti-freeze¹⁰⁹ and empty pesticide containers¹¹⁰ from the requirement to obtain a Certificate of Approval, provided that certain conditions are met. This is intended to facilitate the recycling or proper disposal of these wastes. These arrangements are discussed in detail in the relevant chapters of this report.

Similar provisions are made for sites which collect "stationary"¹¹¹ and "mobile" "refrigerant waste"¹¹² (i.e. Chloroflourocarbon (CFC's), Hydrochlorofluorocarbons (HCFC's) and Hydrofluorocarbons (HFC's)) from air conditioners, heat pumps, refrigerators, and freezers for recycling or disposal. Refrigerant recycling sites are required to recycle the waste for further use and keep records of the sources and fate of wastes received. Stationary refrigerant disposal sites are exempted from the requirement to obtain a Certificate of Approval, provided that they operate in accordance with prescribed conditions regarding site access, storage, fire-fighting and spill clean-up and containment equipment, and notification of the Ministry. However, these conditions do not apply to "mobile refrigerant" disposal sites.

No requirements are established regarding the actual disposal of refrigerants at either type of site.¹¹³ As noted earlier, no technology currently exists to safely destroy ozone depleting refrigerants. The disposal of refrigerant containers is prohibited unless they are certified as being empty.¹¹⁴ The Ministry of Environment and Energy has estimated that the phasing out of CFC's will eventually require the treatment of 40,000 tonnes these chemicals.¹¹⁵

Finally, an exemption from the requirements of Part V of the Environmental Protection Act and waste generator registration and manifesting for the handling of "recyclable material" was introduced in 1985.¹¹⁶ Such material was defined as:

- "waste transferred by a generator and destined for a site,
- (a) where it will be wholly utilized, in an ongoing agricultural, commercial, manufacturing, or industrial process or operation used principally for functions other than waste management and that does not involve combustion or land application of the waste,
 - (b) where it will be promptly packaged for retail sale, or
 - (c) where it will be offered for retail sale to meet a realistic market demand,

but does not include,

- (d) hazardous waste or liquid industrial waste unless the transportation from generator to site is direct, and
- (e) used or shredded or chipped tires."

This provision was amended in 1994¹¹⁷ to exempt from Part V of the Act and Regulation 347:

"municipal waste, hazardous waste or liquid industrial wastes, other than used or shredded or chipped tires, transferred by a generator for direct transportation to a site:

- i. To be wholly used at the site in an ongoing agricultural, commercial, manufacturing or industrial process or operation used principally for functions other than waste management if the process or operation does not involve combustion or land application of the waste;
- ii. to be promptly packaged for retail sale to meet a realistic market demand; or
- iii. to be offered for retail sale to meet a realistic market demand."

These provisions have been intended to facilitate the reuse or recycling of wastes. At the same time, they seek to limit the extent of the exemption granted to materials sent for recycling. This reflects the long-standing experience in the province with the illegal disposal of hazardous and liquid industrial wastes, causing significant environmental damage, under the guise of "recycling."¹¹⁸ However, the definition is widely regarded as ambiguous and subject to different interpretations.¹¹⁹ The Ministry of Environment and Energy has stated that it considers the pre-treatment or processing of potentially recyclable materials to be a waste management activity which requires a Certificate of Approval.¹²⁰

A recent court decision dealing with this issue concluded that only "unusable leftovers" for processing or recycling operations should be considered "waste" and therefore subject to the requirements of the Environmental Protection Act. If upheld, this ruling would exempt a very wide range of activities dealing with hazardous and liquid industrial wastes from the current regulatory requirements.¹²¹

ii) On-site Disposal: Direct and Indirect Discharges to Water, Air and Land

The Ministry of Environment and Energy has stated that approximately 40% of the "subject" wastes registered as generated in the province are disposed of on-site.¹²² This includes discharges to sanitary sewer systems, on-site water pollution control plants, landfills, and incineration. The regulatory requirements applicable to these practices vary widely. On-site incinerators and landfills for hazardous and liquid industrial wastes are subject to the same approval requirements under Part V of the Environmental Protection Act as off-site commercial facilities. However, they are not normally designated for environmental assessment under the Environmental Assessment Act.

Direct Discharges to Surface Waters

Direct industrial discharges to water, via on-site water pollution control plants, are subject to the sectoral discharge regulations established under the Municipal Industrial Strategy for Abatement (MISA) program, initiated in 1986. The program includes discharge regulations applying to a total of approximately 190 facilities in the petroleum refining, pulp and paper, metal mining, industrial minerals, metal casting, iron and steel, organic and inorganic chemical, and electric power generation sectors.¹²³ Sludges generated through end-of-pipe pollution control systems are subject to the waste manifesting requirements if they are shipped off-site for treatment or disposal.

Industrial Discharges to Sewers

Industrial discharges of hazardous or liquid industrial waste to municipal sewer systems are not subject to any provincial regulatory structure. There are estimated to be 12,000 such "indirect dischargers" in the province.¹²⁴ The Ministry of the Environment proposed in 1988 that MISA include the development of pre-treatment discharge standards for 22 industrial sectors which released wastes in to municipal sewer systems. These standards were to be based on a Best Available Technology Economically Achievable (BA TEA) model.¹²⁵

The sewer-use components of the MISA program encountered substantial resistance from municipal governments in the province. The Environment Ministry's threat to prosecute municipalities who are unwilling to live up to their enforcement responsibilities regarding the discharge of industrial wastes into municipal sewer systems¹²⁶ was a source of particularly strong discontent. Many municipalities argued that in the absence of adequate financial assistance from the province, they lacked the resources to control sewer use adequately.¹²⁷

As a result, movement on the SA TEA regulatory standards for sewer discharges stalled. The Ministry moved to revive discussion on the issue in 1994 and 1995, although the primary focus was on the promotion of voluntary action by indirect dischargers. No action on the issue has occurred since the June 1995 election.¹²⁸ In the interim, municipalities, using the authority granted to them by the Municipal Act, have continued to develop and apply sewer use by-laws based on the model by-law that was issued by the Ministry of the Environment in 1988.¹²⁹

Surveys of the 90 largest municipalities conducted by the Ministry in 1990 and 1991 revealed that 98% had adopted such by-laws. However, only 47% had established sampling and inspection programs, and a mere 9% had taken enforcement actions.¹³⁰ Furthermore, the model by-law permits municipalities to enter into sewer use agreements with industrial dischargers, permitting discharges above the levels suggested in the model-by law in exchange for sewer use fees.¹³¹

iii) Spills

Part X of the *Environmental Protection Act*, originally enacted in 1979 and proclaimed in force in July 1985, requires that spills, defined as "a discharge into the natural environment from or out of a structure, vehicle, or other container, that is abnormal in quantity in light of all the circumstances of the discharge," be reported to the Ministry of Environment and Energy.¹³²

Spills must be reported by the person who had control of the pollutant immediately before the spill, and the person responsible for the spill, if it causes or is likely to cause an adverse effect, such as injury or damage to property or to plant or animal life, harm or material discomfort to any person.

The provisions of Part X also established a duty to clean up spills, permitted municipalities to respond to spills and recover costs, and permitted the Minister of the Environment to order the discharger to respond to a spill. In addition, the provisions established a right to compensation for costs and damages incurred, and created an Environmental Compensation Corporation which was to provide assistance to victims of spills in obtaining compensation.

4) Monitoring and Enforcement

i) Provincial

Ontario's regulatory system regarding hazardous wastes was established in response to pattern serious problems related to the handling, storage, transportation, 'recycling' and disposal of such wastes which emerged between the late 1960's and early 1980's.¹³³ Substantial resources were added to the Ministry's environmental law enforcement efforts from 1985 onwards, coinciding with the major revisions to the regulatory system which took place at the same time. This included the creation of an Investigation and Enforcement Branch within the Ministry.

Over the past decade the handling of 'subject' wastes has been the subject of a significant number of prosecutions, involving serious violations resulting in substantial harm to the environment and risk to human health and safety. This has been reflected in the Ministry's annual reports on enforcement activities, which were published annually until 1995.¹³⁴

The Ministry's enforcement efforts with respect to the management of hazardous and liquid Industrial wastes, were subject to significant criticism by the Provincial Auditor in his 1991 report to the Legislature. In particular the Auditor highlighted the Ministry's failure to ensure that all wastes shipped were received at the intended disposal facilities, failure to follow up on discrepancies noted in over 70 per cent of the exception reports samples, problems related to industrial discharges to sewers, and failure to ensure that all generators were registered as required.¹³⁵

Partially as a result of the Provincial Auditor's reports, the Ministry undertook enforcement programs specifically aimed at handling of 'subject' waste shipped off site for disposal or 'recycling.' Most recent of these efforts was project HAUL, conducted in 1993-94, resulting in the laying of 145 charges, 106 convictions, \$99,000 in fines and \$25,000 in creative sentencing.¹³⁶

Former Ministry of Environment and Energy staff have noted that prosecutions related to waste management tended to involve deliberate efforts to circumvent the law. This was in contrast to other types of offences dealt with by the Ministry, which typically resulted from such factors as accidents, human error, equipment failures.¹³⁷

Illegal Hazardous Waste Disposal: A Case Study

In August of 1991, Garry Bernard Young of Oshawa, the owner of a company that manufacturers detergents and cleaners and blends die with fuel oil, found himself with a large number of drums containing liquid wastes both from his business and from a company that had shared his premises. Due to neighbour's complaints about the drums and skids on the property, Mr. Young was ordered to clean up the site.

Instead of hiring a certified hauler to properly dispose of the drums, Mr. Young told a third party, Allan J. MacDonald that he could have them and some skids to use for his own purposes. Mr. MacDonald agreed to take all of the drums from the property. Mr. Young was aware that Mr. MacDonald had a reputation for illegally disposing of drums and that the liquid would probably not be handled in a legal manner.

Mr. MacDonald used a wire brush to scrape away labels on the drums in the yard to prevent them from being traced. Some of them containing liquid industrial waste as well as empty ones were taken to a site in Scugog Township and abandoned. Liquid leaked onto the ground and into the groundwater. Drums were also discarded at other locations. When Mr. Young discovered the manner in which Mr. MacDonald had disposed of the drums, he refused to give him any more. The illegal disposal of the drums was brought to the Ministry's attention by local citizens. The Ministry of Environment and Energy eventually paid in excess of \$33,000 for the cleanup and disposal of the drums and removal of contaminated soil.

On June 17, 1993, Garry Bernard Young was sentenced to a one-month jail term for discharging petroleum distillate and for violating waste management regulations. The jail sentence was imposed despite evidence at a sentencing hearing that the defendant had a reputation in the community for honesty, integrity and fairness.

Allan J. MacDonald who actually disposed of the waste drums, was convicted in May 1994 and sentenced to a five-month jail terms in addition to two months pretrial custody.

Excepted from: Ministry of Environment and Energy, Offences Against the Environment: Convictions in 1993, pg.20.

Case Study: Varnicolor Chemical Ltd

On September 3, 1992, Justice of the Peace Sharon Woodworth Sent Severin Argenton to jail for eight months for allowing toxic wastes to contaminate the environment. This marked the longest prison term in Canadian history for an offence against the environment. Mr. Argenton was the president and owner of Varnicolor Chemical Limited, operating a hazardous waste disposal site in Elmira.

Varnicolor held a ministry Certificate of Approval (C of A) for recycling solvents, mostly waste paints. The recycled solvents were sold back to industry. The residues were bulked for disposal as waste derived fuel in the United States. However, after the passage of Ontario Regulation 309 under the EPA, Varnicolor began expanding its business without ministry approval. The company wanted to take advantage of increasing demands for cheap alternative hazardous waste disposal.

Varnicolor began accepting many different kinds of hazardous waste for storage purposes. Under its C of A, the company was not permitted to do this. Its laboratory was not equipped to analyze the materials received and there was no inventory system to monitor what came in and what went out. At one point, liquid waste described by Varnicolor as waste-derived fuel was rejected upon delivery by a disposal company in Michigan, because the load contained unacceptable levels of PCB's.

Acting on an employees leaked story to the media about the Varnicolor facility, the Ministry of the Environment conducted an audit of the operation between April and June 1990.

While the details of the case and the variety of violations are lengthy, the situation can be summarized.

In carrying on their business transactions, Varnicolor and Mr.Argenton had illegally stored thousands of drums of hazardous chemicals on the Elmira property. The 5,700 drums on the site were not protected by roofing and many were placed directly on the ground, not on concrete pads. When 583 of the drums leaked, chemicals seeped into the soil contaminating local groundwater. The groundwater flowed into a creek, connected to the Grand River, the source of drinking water for the City of Brantford and the Regional Municipality of Waterloo.

Among the chemicals stored at Varnicolor were chlorinated solvents, of which some types can cause cancer.

The first charges in the case were laid on July 27, 1990. In the end a total of 42 charges were laid against Mr. Argenton, Varnicolor and related defendants. All of the defendants originally pleaded not guilty.

Cleanup costs for the site have been estimated at \$2.5 million.

Excerpted from; Offences Against the Environment: Environmental Convictions in Ontario 1992 (Toronto: Ministry of the Environment, 1993).pp.7-8.

ii) Federal

At the federal level, there have been persistent reports that Environment Canada lacks the resources necessary to enforce the transboundary hazardous waste regulations under the CEPA.¹³⁸ This is despite the consideration that the enforcement of the CEPA PCB storage, ozone depleting products, and hazardous waste import/export regulations have been identified as priority areas by Environment Canada. However, the Department has typically undertaken only one or two prosecutions per year in relation to these regulations,¹³⁹ although there were nine prosecutions reported in the 1995-96 fiscal year.¹⁴⁰

5) Hazardous Waste Reduction and Pollution Prevention Initiatives

The concept of promoting the reduction, reuse or recycling of hazardous wastes as a component of the province's policies towards hazardous waste was first introduced by the Legislature's Standing Committee on Resources Development in a December 1978 report.¹⁴¹ The government's June 1983 Blueprint for Waste Management in Ontario, made waste reduction, reuse, recycling and recovery (i.e. energy from waste) a central element of the province's waste management strategy. Specific measures to implement this component of the province's strategy began to emerge in the mid 1980's, beginning with the establishment of the Ontario Waste Exchange in April 1984, with the support of the Ministry of Environment and the OWMC.¹⁴²

i) OWMC Activities

In addition to its efforts to establish a hazardous waste treatment and disposal facility, the OWMC provided a Direct Assistance Program, which provided waste reduction audit and technical assistance services to hazardous waste generators. The program was widely regarded as being highly successful. When the provincial government rejected the OWMC's appeal of the Joint Board's decision against the Corporation's proposed hazardous waste treatment and disposal facility in February 1995, it stated that the waste reduction component of the OWMC's activities was to be continued.¹⁴³ However, the program was transferred to the Ministry of Environment and Energy when the new Progressive Conservative government dissolved the OWMC in August 1995. This effectively terminated the program as it became a casualty of the Ministry's program elimination and budgetary reduction activities.

ii) Provincial Programs

Industrial Waste Diversion Programs

Following the 1985 election a number of steps were taken to implement the waste diversion components of the Blueprint for Waste Management. Most notably, a 4Rs unit was established within the Waste Management Branch of the Ministry of Environment to coordinate hazardous waste reduction, reuse, recycling and recovery activities. In 1987, an Industrial Waste Diversion Program was established to provide financial support to industrial, commercial and institutional sector projects.

In February 1995, the government stated that the Program was to be refocused on hazardous waste diversion projects based on waste reduction at source.

It was stated that \$20 million were to be committed to the program over the next five years.¹⁴⁴ Support for hazardous waste diversion technology was also provided through the Ministry's Environmental Technology Program, established in March 1990 with a 5 year budget of \$30 million. This was extended in early 1995 for a further two years. However, the budgets for these programs have been largely eliminated since the 1995 provincial election, and they are stated to not be accepting new applications.¹⁴⁵

Green Industry Analysis and Retrofits

In 1994, the Ministry of Environment and Energy established a Green Industry

Analysis and Retrofits Program as part of its Green Industry Strategy. This provided for audits of energy efficiency and solid and hazardous waste reduction opportunities at individual industrial facilities. The provision of grants in support of these activities has been terminated by the Ministry. However, the Ministry continues to provide a Clean Production Services program. This includes preliminary on-site evaluations of facilities process by Ministry staff to identify potential energy and resource use savings. Sectoral resource conservation guides targeted principally at small and medium-sized enterprises are also being made available.¹⁴⁶

Pollution Prevention Pledge Program

In October 1993, the Ministry established a Pollution Prevention Pledge Program. This was intended to encourage firms to undertake pollution prevention planning activities on a voluntary basis.¹⁴⁷ Approximately 200 sites are registered under the program, including a significant number of non-industrial public sector entities.¹⁴⁸

Memoranda of Understanding

Over the past four years the Ministry of Environment and Energy and Environment Canada have entered into a series of memoranda of understanding with specific industrial sectors, including automotive parts manufacturing, chemical production, metal finishing, automotive manufacturing, and printing and graphics. The principal goal of the agreements is the development of voluntary pollution planning projects to reduce the use, generation and/or release of toxic substances.¹⁴⁹

Significant reductions in the generation of hazardous wastes have been reported in some sectors participating in these agreements, particularly automotive manufacturing.¹⁵⁰ However, the agreements have been heavily criticized on the basis that such arrangements represent a return to closed, bilateral industry-government policy-making practices, are unenforceable, are unlikely to be cost-effective, and are being employed as substitutes for, rather than supplements to, regulatory frameworks for environmental protection.¹⁵¹ These concerns have been further highlighted by recent proposals by the Ministry to reduce regulatory and reporting requirements in exchange for commitments to pollution prevention activities established through such agreements.¹⁵²

6) Approaches to Hazardous Waste Management in Other Jurisdictions

i) U.S. Federal Government

In the United States, a national regulatory framework for hazardous waste management is based on the Resource Conservation and Recovery Act (RCRA) of 1976. The Act was intended to provide for "cradle to grave" management of hazardous waste. The RCRA was amended in 1984 to set more rigorous requirements for landfill and incinerator design, performance and financial securities. The amendments also provided for the progressive banning of the land applications of untreated wastes.¹⁵³

The *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) was enacted in 1980 in the aftermath of the Love Canal disaster in Niagara

Falls, New York.¹⁵⁴ The Act established the Superfund program to handle emergencies and clean-up sites in need of remediation. CERCLA was amended in 1986 through the *Superfund Amendment and Reauthorization Act* (SARA). One of the provisions of SARA was a requirement that in order to be eligible for Superfund program funding states were required to demonstrate that they have adequate capacity to treat and dispose of waste generated within their borders for the next 20 years.¹⁵⁵

Title III of SARA is known as the Emergency Planning and Community Right to Know Act (EPCRA). Enacted in the aftermath of the December 1984 accident in Bhopal, India, which killed more than 2,000 people, these provisions provide the basis for the Toxics Release Inventory (TRI). Under the original TRI provisions, companies in designated sectors manufacturing or processing more than 25,000 pounds of 308 designated substances, or otherwise using 10,000 pounds of these substances, were required to report their releases to the air and water annually to the Environmental Protection Agency. This information is then made available to the public.¹⁵⁶

The TRI requirements were amended in 1990 through the Pollution Prevention Act to require reporting on the treatment, incineration, on and off-site recycling and disposal of TRI substances. The further expansion of the TRI was a major commitment of the Clinton Administration, elected in 1992. In 1994 the inventory was widened to require reporting by federal facilities. As well, 286 new substances were added to the reporting requirements.¹⁵⁷ The TRI was further expanded in May 1997 to include facilities in seven additional sectors (metal mining, coal mining, electric utilities, commercial hazardous waste treatment, petroleum bulk terminals, chemical wholesalers and solvent recovery services) previously exempted from reporting requirements.¹⁵⁸

The EPA has proposed to add dioxin and 27 dioxin-like compounds to the TRI and is considering lowering TRI reporting thresholds for other highly toxic chemicals which may not otherwise be captured by the Inventory due to the small quantities in which they are used or released.¹⁵⁹ The EPA is considering adding reporting requirements regarding worker exposure and chemical use as well.¹⁶⁰

The expansion of the TRI also has been the target of action in the U.S. Congress. In May 1997 a Bill was introduced into the House of Representatives with 93 co-sponsors to further increase the TRI reporting mandate.¹⁶¹ The Bill includes requirements that the EPA lower TRI reporting thresholds for highly toxic substances, and add dioxin and recognized bioaccumulative chemicals to the reporting requirements.¹⁶² The Bill also requires that industries reporting under the TRI disclose chemicals transported through neighbourhoods, used in the facilities, and put into products.¹⁶³ Furthermore, manufacturers would be required to report on the presence of toxic substances in products, and to demonstrate their safety.¹⁶⁴

In addition to the expansion of the TRI, the U.S. federal government has taken a number of other steps to increase the amount of information available to the public regarding the generation and management of hazardous wastes. In May 1996 the EPA adopted a rule under the Clean Air Act requiring approximately 66,000 facilities that hold large quantities of 140 volatile, acutely toxic and flammable chemicals to assess their

potential for catastrophic, accidental air releases, record their release history, undertake programs to prevent and respond to chemical accidents, and disclose this information in publicly-accessible risk management plans by the summer of 1999. The rule will affect a wide range of regulated entities, such as: chemical plants and refineries that use several chemicals; manufacturers using nitric, hydrofluoric, and hydrochloric acid; users and distributors of propane; fertilizer retailers with ammonia tanks; ammonia based refrigeration systems; and water treatment facilities.¹⁶⁵

The Environmental Protection Agency has also made commitments to the development of rules under the Clean Air Act for hazardous waste incinerators and cement kilns which burn hazardous wastes, and medical waste incinerators.¹⁶⁶ These will be based on a maximum achievable control technology (MACT) standard.

At the same time, however, the EPA has taken a number of steps which weaken the regulatory regime for hazardous waste management. The November 1994 expansion of the number of substances for which TRI reporting was required was accompanied by the elimination of full TRI reporting requirements for facilities generating less than 500 pounds of waste (prior to recycling, treatment or disposal). Rather, such facilities file an annual certification and keep records documenting the exemption. This arrangement has been estimated to have affected one quarter of the total reports filed under the program.¹⁶⁷

In addition, in March 1996, President Clinton signed amendments to the RCRA, permitting the land disposal of certain wastes. Specifically, the legislation stated that such wastes would not be prohibited from land disposal if they are managed under: (1) a treatment system whose discharge is regulated under the Clean Water Act; (2) a Clean Water Act equivalent system or (3) a Class I non-hazardous injection well regulated under the Safe Drinking Water Act.¹⁶⁸ In addition, the EPA has proposed to: allow "low-risk" listed hazardous wastes to exit the hazardous waste regulatory system; establish reduced regulatory requirements for retail outlets and other entities that collect discarded batteries, thermostats and pesticides for recycling; and "modify" its definition of wastes to reduce impediments to "environmentally sound" recycling.¹⁶⁹

ii) U.S. State Governments

In addition to the requirements of federal legislation, a number of states have adopted legislation and programs intended to reduce hazardous waste generation and promote pollution prevention. One of the most important trends in this context has been the adoption, in the late 1980's and early 1990's, by significant number of states of legislation promoting or requiring reductions in the use of toxic substances, and the conduct of pollution prevention planning activities by facilities using designated substances.

The Massachusetts Toxics Use Reduction Act of 1989 is widely regarded as one of the most successful of these state programs. The Act sets a goal of a 50% reduction by 1997, measured against a 1987 base year, in the quantity of toxic and hazardous wastes generated by Massachusetts industries. Under the Act, approximately 600 firms which qualify as "Large Quantity Toxics Users" must report annually to the state Department of Environmental Protection on their use of toxics and generation of toxic by-products. These

firms are defined as employing ten or more full-time workers, and qualifying to report under the federal TRI requirements.¹⁷⁰

By-products are defined by the Act as "all non-product outputs of toxic or hazardous substances generated by a production unit, prior to handling, transfer, treatment or release."¹⁷¹ Consequently, a by-product includes materials that are recycled, reused or reprocessed on site, but outside of the production process in which it is generated, as well as materials released to the air and water or transferred off-site.¹⁷²

Affected firms are required to establish a facility toxics use reduction team, which prepares a toxics use reduction plan. The team evaluates the facility for toxics use and by-product generation, identifies toxics use reduction options, and evaluates the options based on technical and economic feasibility as well as environmental, health and safety impacts. The plan must be certified by a Department of the Environment-certified toxics use reduction planner. However, The Act does not require that a facility implement any toxics use reductions, or to achieve any specific reduction goals. It only requires that a facility have a plan.¹⁷³

The program is integrated with federal TRI reporting requirements, and is financed through an annual fee charged on the use of chemicals for which the planning requirements apply. A Toxics Use Reduction Institute has been established at the University to Massachusetts -Lowell, to provide training for toxics use reduction planners, and conduct research on toxics use reduction technologies.¹⁷⁴

An evaluation of the program completed in March 1997 concluded that between 1990 and 1995, it had resulted in a drop in chemical use of 20% and by-product generation of 30%.¹⁷⁵ The total costs of implementing the program were identified as \$77 million, while monetized benefits were placed at \$91 million. This does not include benefits to human health or the environment.¹⁷⁶ An evaluation of the New Jersey Pollution Prevention Act of 1991, which employs an approach similar to that used in Massachusetts, completed in December 1 996, also noted a consistent decline in non-product output from covered facilities, particularly in sectors where national trends in releases of TRI substances have increased.¹⁷⁷

In addition to pollution prevention planning requirements, a number of U.S. state governments, including North Carolina, New York, Georgia, Colorado, Oregon, Pennsylvania, impose annual fees on hazardous waste generators to recover the costs of the operation of hazardous waste programs. Fees are usually based on the amount of waste generated and/or the disposal method.¹⁷⁸

7) Conclusions

The adoption of the waste generator registration provisions and comprehensive waste manifesting provisions of Regulation 347 in 1985 placed Ontario in the forefront of hazardous waste management policy in North America. However, since then, the regulatory framework has remained largely static, and has been increasingly overtaken by developments in other jurisdictions, particularly at the U.S. federal and state levels. These jurisdictions have moved towards comprehensive public reporting requirements regarding

the generation and fate of pollutants, and are increasingly linking these requirements to pollution prevention and hazardous waste reduction activities. Significant reductions in the use of toxic substances and the generation of hazardous wastes, in addition to the achievement of cost savings to the affected firms, have been attributed to these programs.

In addition, the comprehensiveness of the Ontario system has been eroded by series of exemptions for the handling of specific waste streams. The most important of these relates to the 'recycling' of subject wastes. Conditional exemptions have also been granted for activities related to the collection of waste oil, pesticide containers, and refrigerants over the past few years.

IV. INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL SECTOR HAZARDOUS WASTE MANAGEMENT IN ONTARIO

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1) Introduction

Ontario industries, institutions and commercial establishments have been estimated to generate between 1.15¹⁷⁹ and 2.5¹⁸⁰ million tonnes a year of hazardous and liquid industrial wastes, depending on the data sources and assumptions used. A further 1.5 million tonnes have been estimated to be in storage.¹⁸¹ The Ministry of Environment and Energy has stated that approximately 40%¹⁸² of these wastes are dealt with on the site of their generation. This includes being discharged into municipal sewer systems, water pollution control facilities prior to being discharged into surface waters, landfilling, landfarming, incineration or burning as fuel. Each of these activities is associated with significant environmental impacts.

The Ministry of Environment and Energy's estimate regarding off-site disposal implies that the remaining 60% of the waste generated each year in Ontario is shipped off-site to sewage treatment plants, and for landfilling, incineration, chemical or physical treatment, reclamation or recycling. These fates also have been linked to significant environmental effects. Portions of the hazardous wastes generated in Ontario are transferred out of Ontario for disposal or recycling. As well, Ontario is an importer of hazardous wastes, principally for recycling.

2) Waste Generation and Composition

i) Data Sources

Data on the generation of hazardous and liquid industrial wastes from industrial, commercial and institutional sources in Ontario are available from several sources. These include the Ministry of Environment and Energy's Waste Generator and Manifest Databases, established in 1985. The federal National Pollutant Release Inventory (NPRI) is another a potential source of information, although reporting only began in 1993, and release data have only been made public for three years (1993, 1994 and 1995).

It is also important to note that significant differences exist between the scope of the Ontario databases and the NPRI in terms of the types and numbers of substances which must be reported and the frequency and structure of reporting. Some limited data on interprovincial and international movements of hazardous waste are made available by Environment Canada as a result of the public reporting requirements under CEPA regarding the export and import of hazardous wastes.

Voluntary industry reporting programs are additional potential sources of information. However, the leading program sponsored by the federal government, Accelerated Reduction/Elimination of Toxics (ARETS) only requires reporting of releases of 101 substances to the air and water. There are no reporting requirements for transfers of substances off-site for disposal, recycling or reuse.¹⁸³ The Canadian

CHART 3 : Requirements of OGRD, OWMD, NPRI and ARETS Reporting Programs

Reporting Program	Substances/waste classes covered	Reporting Total Waste Generated prior to disposal, treatment, recycling or transfer	Releases to air, water, land, underground injection	Transfers off-site for disposal	Transfers off-site for recycling, reuse or energy recovery
Ontario Waste Generator Database	'Subject' waste defined by Ontario Regulation 347. Includes 11 waste classes plus 'liquid industrial waste' and 'registerable solid wastes.'	Reported, except for direct releases to the atmosphere, on-site recycling (except residues), transfers for recycling where waste is 'wholly used,' and on site use as 'waste derived fuel.'	Releases to on-site treatment facilities reported. Total discharges to environment not reported. Direct releases to atmosphere not reported.	Reported through waste manifest system.	Reported, with limited exemption for 'recycling' activities.
Ontario Waste Manifest Database	As per Waste Generator Data base, but only for wastes transferred off-site for disposal/treatment or recycling.	Only reports wastes transferred off-site for disposal, treatment, recycling, or recovery. Limited exemption for recycling activities	Only transfers off-site reported.	Reported.	Reported, with limited exemption for 'recycling' activities.
National Pollutant Release Inventory	178 named substances	Only releases to environment or transfers off-site reported	Reported.	Transfers for treatment or final disposal reported.	Reporting voluntary only. To be made mandatory in 1998 reporting year.
CEPA Hazardous Waste Import/Export Regulation	Wastes in <i>Transportation of Dangerous Goods Act</i> classes and 111 waste types listed in Schedule II, Part III of CEPA.	Only transfers in to/out of province/ Canada reported.	Only transfers in to/out of province/ Canada reported.	Transfers out of/in to province/ Canada for disposal reported.	Transfers out of/in to province/Canada for 'recycling' reported.
ARETS	117 named substances	Only releases to air or water reported	Releases to air and water reported.	Not reported	Not reported.
Toxic Release Inventory (U.S)	594 named substances	Total Generation of waste substances reported since 1990.	Reported	Reported	Reported. On-site recycling also reported since 1990.

Chemical Producers' Association's emission reporting program, on the other hand, does include reporting of on- and off-site hazardous waste disposal and recycling.¹⁸⁴

ii) Waste Generation

As of 1991, there were more than 27,000 waste generators in Ontario registered with the Ministry of Environment and Energy, who were estimated to produce more than 61,000 waste streams.¹⁸⁵ The OWMC, using the Ministry of Environment and Energy's Waste Generator Database developed the figures for total subject (i.e. hazardous and liquid industrial as defined by Regulation 347) waste generation in the period 1986 -1991 outlined in **Table IV-1**. These are the most recent figures available regarding total subject waste generation in Ontario.

The data appear to suggest a slow upward trend in waste generation. However, it is important to note that serious questions have been raised regarding the reliability of the Waste Generator Database figures. These include concerns that: generators of one-time only waste remain in the database; waste generators who go out of business are not deleted from the database; there is no penalty if the estimated waste quantity generated is not accurate; there is no requirement that generators update their registration if the intended waste management practice changes; and there is a incentive to initially register high levels of waste generation to avoid the need to re-register if actual waste generation rises.¹⁸⁶

Table IV-1: Hazardous and Liquid Industrial Waste Generation in Ontario

Year	Reported Waste Generation (Tonnes)
1986	3,326,106
1987	4,734,119
1988	5,463,724
1989	5,589,018
1990	4,222,757
1991	4,817,844

In its decision regarding the Environmental Assessment of the Ontario Waste Management Corporation's (OWMC) proposed hazardous waste treatment and disposal facility, the Joint Board concluded that only between 50% and 60% of the registered wastes reported as generated under the Waste Generator Database actually existed.¹⁸⁷ For its part, in its 1992 Status Report on Ontario's Air, Water and Waste, the Ministry of Environment and Energy gave a total figure for 1991 of 2 million tonnes a year.¹⁸⁸ This estimate appears to include a correction factor along the lines of that accepted during the OWMC assessment.

On the other hand, in his 1996 Annual Report, the Provincial Auditor expressed concern over Ministry of Environment and Energy estimates that over half of the generators registered had never reported any disposal of hazardous wastes. The Ministry was reported as not having any information regarding whether these generators had gone out of business, were no longer producing hazardous waste, were simply not reporting their waste generation, or were disposing of waste illegally.¹⁸⁹ This raised the possibility that

significant under-reporting of waste generation might be occurring.

Given these considerations, it is difficult to draw clear conclusions from the Waste Generator Database data. However, in its decision regarding the OWMC project, the Environmental Assessment Board accepted an estimate that hazardous and liquid industrial waste generation in the province would increase by approximately 3% per year.¹⁹⁰ This is consistent with recent conclusions regarding hazardous waste generation in major industrial sectors in the United States.¹⁹¹

Data from the Ministry's Waste Manifest Database, which is generally regarded as being more reliable than the Waste Generator Database, are presented in **Table IV-2**. This indicates that the amount of waste being shipped off-site for disposal is roughly stable or increasing slightly.

Table IV-2: Off-Site Hazardous and Liquid Industrial Waste Disposal in Ontario

Year	Total Manifest Datafile Information (Tonnes)
1990	1,579,798.997
1991	1,516,271.601
1992	1,478,087.533
1993	1,476,661.146
1994	1,447,448.133
1995	1,646,382,400

The Waste Manifest data reinforce the conclusion that total waste generation is roughly stable or increasing slowly. There are no data to suggest a significant decline in waste generation in the past decade. The fluctuations in waste generation from year to year may reflect changes in economic conditions. This may account, for example, for the apparent decline in waste generation in the early 1990's during a period of recession, and the more recent increase as the economy has recovered.

3) Waste Sources and Composition

i) Waste Stream Composition

Estimates of the composition of the hazardous and liquid industrial waste stream in Ontario also vary depending upon the assumptions employed. The estimates generated by the Ontario Waste Management Corporation based on 1987 Generator Registry Data, and for the Canadian Hazardous Waste Inventory in 1995, based on 1991 Ontario Waste Generator Database Data are provided in **Table IV-3**.

Table IV-3: Ontario Hazardous Waste Stream Composition

Waste Category	OWMC (1988) (Including Liquid Industrial Waste	Canadian Hazardous Waste Inventory (1991) (Excluding
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	but Excluding Registerable Solid Waste)		Liquid Industrial Waste and Registerable solid waste)	
	Quantity (Tonnes)	% of Total	Quantity (Tonnes)	% of Total
Heavy Metal Solutions and Residuals	2,333,600	65.1%	785,474	51%
Sludges and Inorganic Residuals	112,800	3.1%	282,740	18%
Solvents and Organic Solutions	185,900	5.2%	142,442	9%
Anion Complexes	3,200	0.1%	85,758	6%
Clean-up Residuals	8,200	0.2%	69,434	4%
Organic and Oily Wastes	219,200	6.1%	67,327	4%
Oils and Greases	41,400	1.2%	32,132	2%
Misc. Chemicals and Products	15,000	0.4%	28,623	2%
Organic Sludges and Still Bottoms (no oil)	50,700	1.4%	20,785	1%
Paint and Organic Residuals	68,700	1.9%	13,490	1%
Aqueous Solutions with Organics	521,300	14.6%	13,322	1%
Oil/Water Mixtures	21,600	0.6%	2,148	<1%
Pesticides and Herbicide Wastes	400	0.0%	1,262	<1%
Total	3,582,000	100%	1,544,937	100%

The Canadian Waste Inventory estimate did not include liquid industrial and registerable solid wastes under the Ontario Waste Generator Database, federal facilities and waste imported into Ontario for treatment.¹⁹² The OWMC estimate did not include registerable solid wastes.

In the Ministry of Environment and Energy's 1992 Status Report on Ontario's Air, Water and Waste, the MoEE provided the estimates outlined in **Table IV-4** of the composition of the total hazardous and liquid industrial waste stream in Ontario.

The 1995 data from the MoEE Waste Manifest Database indicating the composition of the total subject waste stream, including both liquid industrial and hazardous wastes, sent off-site for disposal are presented in **Table IV-5**.

Table IV-4: Hazardous and Liquid Industrial Waste Stream Composition 1992 (MoEE)

Waste Type	Percent of Total Generation
Salts and Sludges	40%
Alkalies	13%
Acids	10%
Oily Wastes	10%
Solvents and Fuels	8%
Halogenated Substances	5%
Plastics and Resins	4%
Processed Organics	2%
Other Organics	8

Table IV-5: Wastes Sent Off-site for Disposal - Leading Categories

Waste Class	Description	Total (Tonnes)
149	Landfill Leachates	429,575
254	Transfer Station Oil Wastes	191,468
146	Other Specified Organics	83,559
251	Oil Skimmings and Sludges	70,571
143	Steel Making Residues	66,806
253	Emulsified Oils	66,145
122	Alkaline Waste - other (non-heavy) metals	56,285
252	Waste Oils and Lubricants	55,512
270	Other Specified Organics	48,806
211	Aromatic Solvents	46,198
111	Spent Pickle Liquor	42,877
145	Paint/Pigment/Coating Residues	27,224
121	Alkaline Waste - heavy metals	25,551
212	Aliphatic Solvents	25,361
131	Neutralized Waste - heavy metals	24,337
281	Non-Halogenated Rich Organics	20,856
112	Acid Waste - heavy metals	20,502
Total		1,301,636 (91% of total of 1,428,874)

Heavy metals solutions, landfill leachate, organic sludges and solvents, and oil

wastes appear to make up the largest components of the total subject waste stream in Ontario.

ii) Waste Stream Sources

Estimates of the sources of the hazardous and liquid industrial waste stream in Ontario vary depending upon the assumptions employed as well. The estimates generated for the Canadian Hazardous Waste Inventory in 1995, based on 1991 Ontario Waste Generator Database Data are provided in **Table IV-6**.

Table IV-6: Ontario Hazardous Waste Generation by Industrial Sector (1991)

Sector	Quantity (tonnes)	% of Total
Refined Petroleum and Coal Products Industries	338,684	22%
Paper and Allied Products Industries	254,143	16%
Fabricated Metal products Industries	203,834	13%
Primary Metals Industries	141,528	9%
Transportation Equipment Industries	141,078	9%
Mining Industries	81,339	5%
Chemical and Chemical Products Industries	79,741	5%
Leather and Allied Products	68,120	4%
Local Government Service Industries	62,990	4%
Other Utilities	38,063	2%
Other Service Industries	31,073	2%
Rubber Products Industries	17,691	1%
Transportation Industries	17,390	1%
Health and Social Service Industries	10,772	1%
Electrical and Electronic Products Industries	6,398	<1%
Total	1,492,808	97%

As with the Canadian Hazardous Waste Inventory estimates for waste composition, these figures do not include liquid industrial waste or registerable solid waste as defined for the purposes of the Ontario Waste Generator Database. The OWMC's 1988 estimates, based on 1987 Generator Database Data, and which included liquid industrial wastes, listed fabricated metals and machinery as the largest source of wastes (25.6%), followed by resource-based industries (24.5%) and petroleum, coal and chemicals (12.6%).¹⁹³

For its part, the Ministry of Environment and Energy gave the figures in **Table IV-7**, in its 1992 Status Report on Ontario's Air, Water and Waste.

It is important to note that not all wastes reported as generated are a result of production activities. The clean-up of contaminated sites and other environmental remediation projects can also produce significant amounts of materials, such as contaminated soil and sediments, which require treatment and disposal as hazardous wastes. 70,000 tonnes of hazardous waste were estimated to have been generated in this way in 1991.¹⁹⁴

Table IV-7: Hazardous Waste Generation / Sector 1992

Sector	Percentage of Total
Manufacturing	34%
Transportation	7%
Government	6%
Wholesale trade	6%
Education	5%
Construction	5%
Retail Trade	4%
Utilities	4%
Others (includes forestry, mining, health and social services)	29%

Perhaps reflecting the conflicting range of conclusions arrived at by different agencies analyzing the available data, the Environmental Assessment Board gave no firm conclusions regarding the sources and composition of the subject waste stream in Ontario in its decision regarding the OWMC undertaking. An analysis of the 1994 NPRI data prepared by Environment Canada showed the chemicals and allied products, primary metals and paper and allied products industries to be the leading three sources of releases and transfers of NPRI substances within the Great Lakes Basin.¹⁹⁵

4) Fate of Generated Wastes

i) On-Site Disposal

In its 1992 Status Report on Ontario's Air, Land and Waste, the Ministry of Environment and Energy estimated that 40% of the hazardous wastes generated in the province were disposed of on-site.¹⁹⁶ However, the OWMC Environmental Assessment suggested that a much higher portion of hazardous wastes are disposed of on-site than are shipped off-site.¹⁹⁷

On-site disposal tends to be favoured by larger facilities that generate substantial volumes of waste and can operate disposal facilities cost effectively. Off-site disposal tends to be favoured by smaller companies or for small volumes of wastes that require expensive handling facilities.¹⁹⁸

The fate of hazardous wastes disposed of on-site reported in the OWMC decision for 1991 are outlined in **Table IV-8**.¹⁹⁹

Table IV-8: Fate of Wastes Disposed of On-Site (1991)

Method of Disposal	Total Excluding Liquid Industrial and Registerable Solid Wastes		Total Subject Wastes	
	Quantity	Percent of	Quantity	Percent of

	Tonnes	Total	(Tonnes)	Total
Sanitary Sewer	383,300	38%	394,000	27%
Water Pollution Control Plant	266,500	27%	384,200	27%
Landfill/Landfarm	260,600	26%	371,100	26%
Other Treatment	122,600	12%	143,000	10%
Incineration	35,800	3.5%	112,000	8%
Dust Suppression	1,600	1.6%	29,400	2%
Waste-Derived Fuel	100	0.1%	500	0.07%
Total	1,070,500	100%	1,434,200	100%

The OWMC also reported 1,463,000 tonnes of subject waste to be in storage on site in Ontario. The hazardous portion of this total constituted 234,300 tonnes.²⁰⁰

Many of the on-site waste management practices identified through the Waste Generator Database and other sources have been associated with significant environmental and human health problems.

Discharges to Sanitary Sewers

The leading fate of hazardous and total 'subject' wastes disposed of on site identified by the OWMC was releases into municipal sanitary sewer system. In 1991, 394,000 tonnes were estimated to have been dealt with in this way, 383,000 tonnes of which met the definition of hazardous waste. This is the source a number of serious problems. Sewage treatment facilities are generally only designed to deal with organic wastes. As a result, many toxic substances pass intact through sewage plants to receiving waterways, where they contribute to overall contamination of the environment.

Despite these considerations, the Ministry of Environment does not regulate industrial discharges to sewers, or maintain records of industrial discharges to municipal sewer systems, stating that this is a municipal responsibility.²⁰¹ However, it has estimated that Ontario municipal sewage treatment plants release 18 tonnes of organic compounds and 1100 tonnes of heavy metals into Ontario waterways each year, principally as a result of industrial releases to municipal sewage systems.²⁰²

The Metropolitan Toronto Works Department has developed estimates for industrial discharges to its sewer system. These include a total volume of 33-40 million cubic metres of discharges from industrial sources each year. Metro Works' estimates regarding discharges of specific substances are presented in **Table IV-9**²⁰³.

Heavy metals that are removed in sewage treatment plants are concentrated in sewage sludge, often making the sludge unfit for application to agricultural land as a soil conditioner or fertilizer.²⁰⁴ More recently, concerns have been raised regarding the presence of persistent organic pollutants in sewage sludge, in addition to heavy metals.²⁰⁵ The presence of hazardous waste residues in sewage sludge has also been associated with emissions of heavy metals and persistent organic pollutants from sewage sludge incinerators. Sewage sludge incinerators in Ontario have, for example, been estimated to release more than 1 tonne of metals (mercury, lead, cadmium, chromium, copper and zinc) to the atmosphere, and resulted in the transfer of 208 tonnes of metals to landfills, in the form of ash, each year.²⁰⁶

TABLE IV-9: Industrial Discharges to Metro Toronto Sewer System

Substance	Estimated Discharges (kg/day)	Estimated Discharges (Tonne/yr)
Copper	131	77
Zinc	105	38
Toluene	86	33
Xylene	69	25
Chromium	18	6.5
1,4 dichlorobenzene	2.5	0.912
Mercury	0.2	0.073
Lead	0	0
Cadmium	0	0
Nickel	0	0

The discharge of toxic substances to sewage systems can disrupt sewage treatment processes, resulting in the release of large quantities of untreated or partially treated sewage to the environment.²⁰⁷ Highly acidic or caustic industrial wastes can also corrode piping and equipment in sewer lines and sewage treatment plants.²⁰⁸ Grease and oil can "clog" the sewers, reducing their capacity.²⁰⁹ Furthermore, the discharge of toxic substances to sewer systems may cause serious public and worker health and safety problems such as fires, explosions and the release of poisonous gases.²¹⁰

It is important to note that while the Ontario Waste Generator Database identifies discharges to sewers as the leading fate of hazardous wastes disposed of on-site in Ontario, the 1994 NPRI data indicate that only 1,612 tonnes of NPRI substances were disposed of in this way. Hydrogen chloride, ethylene glycol, and sulphuric acid are identified as the leading NPRI substances disposed of in this way. With respect to metals 5.9 tonnes of zinc and its compounds, 3.6 tonnes of manganese, and 0.952 tonnes of lead are reported in the NPRI data to be have been released.²¹¹

In light of the OWMC's estimates based on the Generator Registry Database data indicating the disposal of nearly 400,000 tonnes of subject waste to sanitary sewers each year, and the Ministry of Environment and Energy's estimates that over 1,300 tonnes of heavy metals are released into the environment from Ontario sewage treatment plants annually, this suggests that there is a serious under-reporting of industrial discharges to

sewers under the NPRI. This point is further reinforced by the consideration that a total of only 2,953 facilities reported under the NPRI in 1994, while more than 12,000 industrial facilities are estimated by the Ministry of Environment and Energy to discharge into municipal sewer systems in the province.

Direct Discharges to Surface Water

Releases to on-site water pollution control plants is the second largest fate of subject and hazardous waste identified by the OWMC through the Waste Generator Registry Database, accounting for 384,000 tonnes in 1991. Approximately 190 industrial facilities in nine industrial sectors directly discharging effluent to surface waters following treatment were identified through the Ministry's MISA program. Regulations controlling discharges for these sectors were put in place between 1993 and 1995. The MISA regulations require the monitoring and reporting of direct discharges by facilities. However, no total figures for the releases of pollutants to Ontario surface waters from these sources have been developed or been made available to the public by the Ministry of Environment and Energy.²¹²

The NPRI does provide data regarding the release of specific substances to surface water from industrial sources. For example, a total of 4,232 tonnes of NPRI substances were reported as being released by Ontario facilities in 1994. This total included: 2,865 tonnes of methanol; 948 tonnes of ammonia; and 244 tonnes of sulphuric acid; 59 tonnes of ethylene glycol; 46 tonnes of isopropyl alcohol; 28 tonnes of zinc; 21 tonnes of manganese; 12 tonnes of copper; and 5 tonnes of toluene.²¹³

The OWMC environmental assessment concluded that the implementation of the MISA program would result in the generation of 17,100 tonnes/yr of residuals, principally sludge from water pollution control facilities. Of this, it was estimated that 13,130 tonnes would require some form of off-site disposal capacity. The remainder could be reused, recycled or otherwise disposed of, on site (i.e. landfill or incineration).²¹⁴

Landfill/Landfarm

The 1988 OWMC Environmental Assessment identified 7 large and 4 small private landfills and sludge farms as being authorized by the Ministry of Environment to receive untreated subject wastes.²¹⁵ The Ministry of the Environment reports that as of 1997, five of these facilities are still active.²¹⁶ The OWMC estimated, on the basis of the Waste Generator Database data that 371,000 tonnes of 'subject' waste were disposed of through landfilling or landfarming on site in 1991.

As noted in chapter II, serious concerns have been raised regarding the environmental impacts of hazardous waste landfill facilities, particularly with respect to leachate. Indeed, the primary reason for the Joint Board's rejection of the OWMC's proposed facility related to the potential contamination of groundwater by the facility's landfill.²¹⁷

The Ministry has indicated a longstanding desire to impose restrictions on the land disposal of hazardous wastes, beginning with hazardous organic wastes, and followed by restrictions on the disposal of non-organic hazardous wastes. It was anticipated that some hazardous organic wastes would be banned from land disposal (e.g. liquids), while treatment standards and allowable concentration limits would be prescribed for other types of hazardous organic wastes.²¹⁸ However, no action has been taken by the Ministry on this matter to date.

With respect to specific substances, the 1994 NPRI data indicate that 5,860 tonnes of NPRI substances were released to land in Ontario that year. This included: 1,906 tonnes of manganese; 1,282 tonnes of ethylene glycol;²¹⁹ 965 tonnes of zinc; and 912 tonnes of copper.²²⁰

Incineration and Energy 'Recovery'

As of mid-1997, there were 71 on-site incinerators or thermal destruction devices, such as boilers or furnaces approved to burn 'subject' wastes. These included 55 industrial facilities, five federal government facilities, four provincial government facilities, three universities, three veterinary facilities and one funeral home. The bulk of the industrial facilities are permitted to burn waste oil and related products, although some are permitted to burn waste solvents and other materials as well. The government and academic and professional facilities are principally authorized to burn pathological wastes.²²¹ The OWMC estimated that 112,000 tonnes of subject waste were incinerated on-site in 1991 and 500 tonnes burned as fuel.

Longstanding concerns have existed regarding emissions from hazardous waste incinerators, particularly such substances as heavy metals, dioxins and furans, carbon monoxide, hydrogen chloride, sulphur dioxide, and nitrogen oxides.²²²

Dust Suppression

The use of used oil for dust suppression in Ontario was banned in 1988 due to concerns over the presence of PCB's in waste oils.²²³ The OWMC estimated that in 1991 29,000 tonnes of subject waste, principally liquid industrial waste, were disposed of on-site as dust suppressants.

The materials currently disposed of through use as dust suppressants in Ontario include spent pulping liquor and "line flush" or "line wash" oils from petroleum refineries.²²⁴ Concerns have been raised regarding the use of these materials as dust suppressants, as they are eventually washed off roads into ditches, and carried into watercourses. Pulp liquors, for example, are high in biological oxygen demand and moderately toxic to fish.²²⁵

Direct Releases to Air

The Ontario Generator Database does not include records of waste substances released directly to the air, as opposed to those sent for incineration. Furthermore, the Ministry has stated that it does not collect data on such releases.²²⁶

However, the NPRI does provide figures for releases to air of NPRI substances from Ontario facilities. The 1994 NPRI data indicate that 46,733 tonnes of NPRI substances were released directly to the atmosphere from Ontario facilities. This total included: 6,305 tonnes of xylene; 5,630 tonnes of toluene; 4,605 tonnes of ammonia; 3,819 tonnes of methanol; 3,497 tonnes methyl ethyl ketone; 2,900 tonnes of sulphuric acid; 2,529 tonnes of cyclohexane; and 1,290 tonnes of benzene.²²⁷

ii) Off-Site Disposal

The Ministry of Environment and Energy's 1992 Status Report on Ontario's Air Water and Waste suggested that 60% of the hazardous and liquid industrial wastes generated in Ontario are disposed of off-site. The fate of 'subject' waste waste sent off-site for disposal in 1993 and 1995, based on figures provided by the Ministry drawn from the Waste Manifest Database, is outlined in **Table IV-10** below.

Table IV-10: Off-Site Disposal of Ontario Subject Waste 1993 and 1995

Receiver type	1993 ²²⁸	1995 ²²⁹
Landfill (Commercial)	90,000	64,473
Private Landfill/Sludge Farm	30,000	42,931
WPCP (Water Pollution Control (Sewage Treatment) Plant)	530,000	481,990
Transfer Station	n/a	233,277
Transfer Station & Processing	200,000	285,358
Export	190,000	180,666
Incineration	60,000	54,172
Reclaimer	110,000	69,561
Dust Suppression	55,000	17,310
Total	1,265,000	1,428,874

With respect to specific substances, 27,393 tonnes of NPRI reportable substances were transferred off-site for disposal in Ontario in 1994. The leading types and fates of these substances is outlined in **Table IV-11**.²³⁰

Table IV-11 Off-Site Disposal of NPRI Substances in Ontario (1994)

Disposal Method	Total (Tonnes)	Leading Substances	Percent of Total
Landfill	9,112	Zinc, Manganese.	41%
Incineration	4,147	Toluene, Xylene.	19%
Chemical Treatment (processing)	1,153	Manganese, Sulphuric Acid.	5%
Physical Treatment (processing)	2,544	Zinc, Lead, Toluene.	11%
Sewage Treatment Plants	1,613	Hydrochloric Acid, Ethylene Glycol, Sulphuric Acid	7%
Underground Injection	810	Sulphuric Acid	4%
Biological Treatment (processing)	590	Ethylene Glycol	3%
Storage	284	Hydrochloric Acid, Xylene, Toluene.	1%
Total	22,254		100%

The NPRI also reports that approximately 93,000 tonnes of NPRI substances were

shipped off-site for recycling in 1994.²³¹ 1,471 tonnes of NPRI substances were reported to be shipped off-site for energy recovery.²³²

All forms of off-site disposal carry with them the possibility of spills or accidents during the transport of wastes to a disposal or recycling site. In addition, as with the on-site disposal of wastes, many of the fates of wastes shipped off-site for disposal have been associated with significant environmental problems.

Sewage Treatment Plants

By far the largest component of the liquid industrial and hazardous waste stream dealt with off-site in Ontario are landfill leachates sent to sewage treatment plants (STPs) for disposal, with 429,000 tonnes being transferred in 1995. It is important to note that the Waste Manifest Database figures only include leachate shipped by truck to STP's. It does not include leachate generated at landfills where the leachate collection system is directly connected to a municipal sewage system.

Leachate is generated through the process of decomposition and percolation of moisture through waste at municipal solid waste (MSW) landfills. Numerous studies have documented that MSW leachate is a grossly polluted liquid containing high concentrations of salts, nutrients, biodegradable organics, heavy metals, and trace amounts of numerous synthetic organic compounds.²³³

Concerns have been expressed regarding the adverse impacts of landfill leachate on STP's as it is a high strength, and in some cases, high volume waste water stream.²³⁴ This may lead to problems similar to those experienced with industrial discharges into municipal sewer systems. Similar concerns have been raised regarding the disposal of hauled liquid industrial waste at sewage treatment plants.²³⁵ The Waste Manifest Database data suggest that approximately 50,000 tonnes of such wastes were transferred to STP's in 1995.

Landfill

Ontario has only one commercial landfill authorized to handle hazardous and solidified liquid industrial wastes. This is the Laidlaw Environmental Services Inc. facility at Sarnia, Ontario.²³⁶ In its decision regarding the OWMC the Joint Board concluded that the facility's current approved capacity would be exhausted "in a few years."²³⁷ The Joint Board also concluded that the lack of long-term disposal capacity in the province was "a deficiency."²³⁸

However, in September 1997 the Ministry of the Environment approved a 1.9 million cubic metre expansion of the Laidlaw Sarnia landfill. This is expected to provide landfill capacity for approximately 15-20 years. Although the expansion was designated under the *Environmental Assessment Act*,²³⁹ and concerns were expressed by members of the public regarding the need for the facility and its potential environmental impacts,²⁴⁰ the Minister did not require a public hearing by the Environmental Assessment Board under the

Act. As a result of Regulation 206/97, this also removed the requirement for a hearing before the Board under the *Environmental Protection Act*.

Six public landfills, located at Guelph, Welland, Brantford, Thunder Bay, Metro-Toronto-Brock West, and Peel, were identified in the OWMC's original environmental assessment documents as receiving hazardous or liquid industrial wastes in 1986.²⁴¹ Five (Guelph, Welland, Brantford, Metro Toronto Brock West, and Peel) of the six facilities have not received any 'subject' waste since 1989, while the Thunder Bay facility last received such waste in 1992.²⁴²

Incineration/Energy Recovery

A total of 54,000 tonnes of 'subject' waste were reported to have been sent off-site for incineration under the Waste Manifest Database in 1995. Ontario has only one hazardous waste incineration facility, also operated by Laidlaw Environmental Services Inc in Sarnia. However, the facility cannot handle solids, sludges, compressed gases, halogenated solvents, PCB's, and pathological wastes. Approval from the MoEE's District Office is required for the facility to destroy halogenated pesticides, non-halogenated rich organics, and non-halogenated lean organics.²⁴³ Laidlaw proposed to construct a new rotary kiln incinerator at the Sarnia site to destroy organic solids and sludges in 1991. This proposal was withdrawn in October 1993.²⁴⁴

With respect to specific substances, the 1994 NPRI data indicate that 4,147 of NPRI substances were disposed of off-site through incineration in that year. The leading substances identified through the NPRI as being disposed of in this way were the solvents toluene (1,129 tonnes) and xylene (871 tonnes).

In the same year, 1,471 tonnes of NPRI substances were reported under the Inventory to have been sent to energy recovery (i.e. burned as fuel). This included 533 tonnes of xylene, 262 tonnes of toluene, 104 tonnes of methyl ethyl ketone, and 101 tonnes of isopropyl alcohol.²⁴⁵

Processing

The 1995 Waste Manifest data indicate that 285,000 tonnes of 'subject' waste were transferred off-site for 'processing' in that year. 'Processing' is defined by the Ministry of Environment to include physical, chemical, biological treatment activities. The residues from processing hazardous and liquid industrial wastes are considered to remain a waste by the Ministry of Environment and Energy.²⁴⁶ Substances dealt with in this way include metals and solvents.²⁴⁷

It should be noted that in the course of the OWMC environmental assessment it was argued that current domestic physical/chemical treatment facilities are "rudimentary" and not adequate to handle current and projected hazardous wastes in Ontario.²⁴⁸ The Joint Board did not appear to dispute this conclusion in its decision.

Reclamation/Recycling

Reclamation or recycling account for the fate of a significant amount of the subject waste generated in Ontario, particularly waste oils, solvents, anti-freeze and metal finishing sludges.²⁴⁹ However, there are major discrepancies between the NPRI and Ministry of Environment and Energy data regarding the composition and amounts of material recycled or recovered in the province.

The Ministry of Environment and Energy's 1995 data suggest that approximately 70,000 tonnes of subject waste were shipped off site for reclamation in that year (**Table IV-10**). The Ministry also indicates that a large portion of this waste is used oils being shipped to the Safety-Kleen facility at Breslau, Ontario. This would appear to be confirmed by Safety-Kleen's own figure of 87 million litres of used oil re-refined in 1995 at its facility.²⁵⁰

However, the 1994 NPRI data indicate that 93,000 tonnes of NPRI substances were reported as sent off-site for recycling or reuse in Ontario that year. This included 36,000 tonnes of manganese (and its compounds), 10,000 tonnes of lead, nearly 10,000 tonnes of copper, and 8,700 tonnes of sulphuric acid.²⁵¹ Transfers of waste oil for disposal or recycling are not required to be reported under the NPRI. The discrepancy between the Ontario waste manifest data and the NPRI data is further compounded when the fact that reporting of the shipment of NPRI substances off-site for recycling is voluntary, and that the NPRI figure does not therefore account for all such shipments is taken into account.

The differences between the NPRI and Ontario figures suggest that hazardous waste recycling activities are not being captured in the Ontario Waste Generator Database and Manifest Database. This may be a result of the exemption for "recyclable materials" from waste approvals, registration and manifesting requirements provided in Regulation 347. However, the scale of the difference may suggest that the conditions of the exemption that materials be "wholly used" or packaged and offered for retail sale to meet a realistic market demand²⁵² may not be being strictly applied or adhered to.

This is of concern given the long-standing experience in the province with the operation of illegal hazardous and liquid industrial waste disposal activities, causing significant environmental damage, under the guise of "recycling."²⁵³ It is also possible that the increase in waste "recycling" activities which has been reported over the past few years²⁵⁴ may be masking growth in the total amounts of subject wastes generated in the province.

The apparent under reporting of recycling activities from the requirements of Regulation 347 is also of concern given the possibility of spills or fires at recycling facilities,²⁵⁵ and occupational health and safety risks associated with the handling of materials which are by definition hazardous. These risks are compounded by the fact that wastes sent for recycling may contain unknown contaminants which may affect the recycling process in unexpected ways.²⁵⁶

In addition, recycling activities may result in the release of hazardous pollutants into the air and water, or generate significant amounts of sludges and other wastes which are

themselves hazardous.²⁵⁷ This is particularly true of reclamation processes for used oil and solvents, as these activities focus on the removal of contaminants from such wastes.

Dust Suppression

In 1995 17,000 tonnes of 'subject' waste were reported to have been transferred off-site for use as dust suppressants under the Ontario Waste Manifest

The Dombind Story

At many pulp and paper mills, wood and bark fragments plus, in some cases, recycled paper and cardboard are reduced to pulp and fibre by cooking them with chemicals. At the end of the process, the resulting "black liquor" contains a variety of tree-based and synthetic chemicals. The black liquor is then moved into evaporators, concentrated into a viscous liquid, and put in storage ponds where it may or not be diluted.

Most pulp and paper mills use their black liquor as fuel to generate heat needed for the cooking process. In 1995, stricter federal and provincial water pollution requirements prompted Domtar Inc.'s Trenton mill to install a 'closed-loop' production system to eliminate its discharges of black liquor to the Trent River.

However, the plant continues to generate black liquor. Instead of being released into the River, it is now being marketed by Domtar as a dust suppressant called "Dombind" for use on unpaved rural roads. It is offered free

to townships willing to collect it in their own trucks.

In 1993, the Ministry of the Environment gave Domtar's black liquor a temporary, 5-year approval as a "product dust suppressant" under the condition that the company analyze the product regularly for contaminants, conduct tests to determine if Dombind contaminants are accumulating on roadsides or poisoning fish, and investigate means of virtually eliminating dioxins and furans from their waste.

Test results indicate that the product has high levels of contaminants and very high toxicity even when diluted. Options for dealing with black liquor in a more environmentally responsible manner have been investigated, but none has been implemented. As a result, the World Wildlife Fund has asked the Ministry of the Environment not to renew its approval of Dombind as a dust suppressant.

Adapted from: World Wildlife Fund Canada, Action Alert: What is that Smelly Black Stuff on the Road?, July 1997.

system. As noted earlier, serious concerns have been raised regarding the use of 'subject' wastes for this purpose, as it involves their direct release into the environment. The recent controversy involving the use of "black liquor" from Domtar Ltd's pulp mill in Trenton Ontario under the product name "Dombind" has highlighted these issues (**See Box**). In addition to the environmental concerns related to the use of this material, there appears to be no statutory basis for the agreement between the Ministry of the Environment and the firm to exempt its use from the requirements of Part V of the *Environmental Protection Act* and Regulation 347.

5) Waste Import/Export²⁵⁸

The past decade, following the signing of the 1986 *Canada-United States Agreement on Transboundary Movements of Hazardous Wastes*, has witnessed the emergence of a continental market for the management of hazardous wastes, with the exception of PCB's, in North America. Ontario is Canada's leading exporter of hazardous

wastes, with the United States being the source or destination for virtually all of the province's international hazardous waste traffic.

The Ministry of Environment and Energy's 1992 Status Report on Ontario's Air Water and Waste, noted that between 1987 and 1992 the portion of Ontario hazardous and liquid industrial waste being exported for disposal rose significantly, from 5% to 17% or 166,000 tonnes. Approximately one third of this total was waste oil exported to processors and reclaimers. According to the MoEE, the remainder was largely chlorinated organic wastes, organic sludges, and other wastes for which Ontario has no disposal facilities.²⁵⁹

Data from the OWMC environmental assessment indicate that the export of Ontario wastes for use as fuel in U.S. cement kilns is a significant component as well.²⁶⁰ The burning of hazardous waste in cement kilns in the U.S. and elsewhere has been associated with serious air pollution problems.²⁶¹

The upward trend in Ontario waste exports appears to have levelled off in the mid-1990's peaking at 190,000 tonnes in 1993, and falling back slightly to 180,000 tonnes in 1995, as shown in **Table VI-12**. Environment Canada's figures for 1991 and 1994, the most recent years for which statistics are available, appear to confirm this trend.²⁶²

With respect to imports, the Ministry's 1992 report indicated a slight decline. Approximately half of Ontario's hazardous and liquid industrial waste imports were reported as coming from the U.S., and the remainder from other provinces. 54% of the import total for 1992 was waste oil destined for recycling.²⁶³

However, more recent figures from Environment Canada, provided in **Table IV-13**, suggest a significant increase in imports over the past few years.²⁶⁴ Environment Canada indicates that the bulk of the increase is related to imports of metals for recycling purposes.²⁶⁵

Table IV-12: Ontario Hazardous Waste Exports to Other Jurisdictions

Year	Exports to Other Provinces (tonnes)	Exports to Other Countries (tonnes)	Total (tonnes)
1991	20,490	133,177	153,667
1994	43,065	118,853	161,918

Table VI-13: Ontario Hazardous Waste Imports from Other Jurisdictions

Year	Imports from Other Provinces (tonnes)	Imports from Other Countries (tonnes)	Total (tonnes)
1991	119,850	52,510	172,360
1994	84,258	129,188	213,446

The increase in exports to other provinces, and decline in imports from other provinces, may reflect, among other things, the opening of the Alberta boarder to imports

of hazardous wastes for disposal in February 1995. This allowed the Alberta Special Waste Management Corporation to accept out of province wastes, including PCB's for disposal.

As presented in **Table IV-14**, a report released by the North American Commission on Environmental Cooperation in July 1997 indicated that Ontario was the overwhelming Canadian recipient of exports of Toxic Release Inventory (TRI) substances from the United States.²⁶⁶

Table IV-14: Canadian Imports of TRI Substances (1994)

Province	Transfers for Recycling	Transfers to Energy Recovery	Treatment / Destruction	Disposal / Containment	Total Transfers	% of Total
Alberta	50.02	0	0	0	50.02	0.002%
B.C.	128.63	2.34	1.41	0	132.37	0.005%
Manitoba	25.71	0	0	0	25.71	0.001%
Ontario	21,768.67	0.024	703.27	14.53	22,486.85	78%
Quebec	5,916.68	0	329.31	39.52	6,285.51	22%
Canada	27,889.70	2.3590	1,034.08	54.31	28,980.45	100%

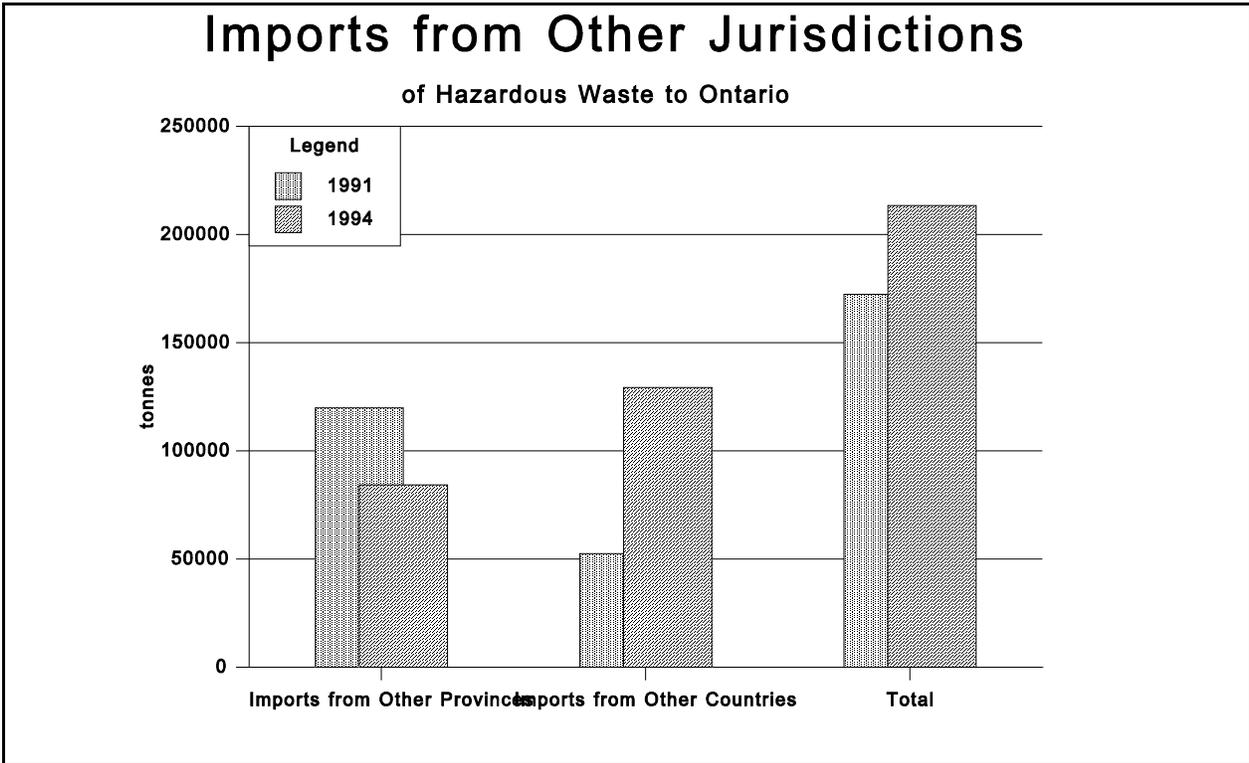
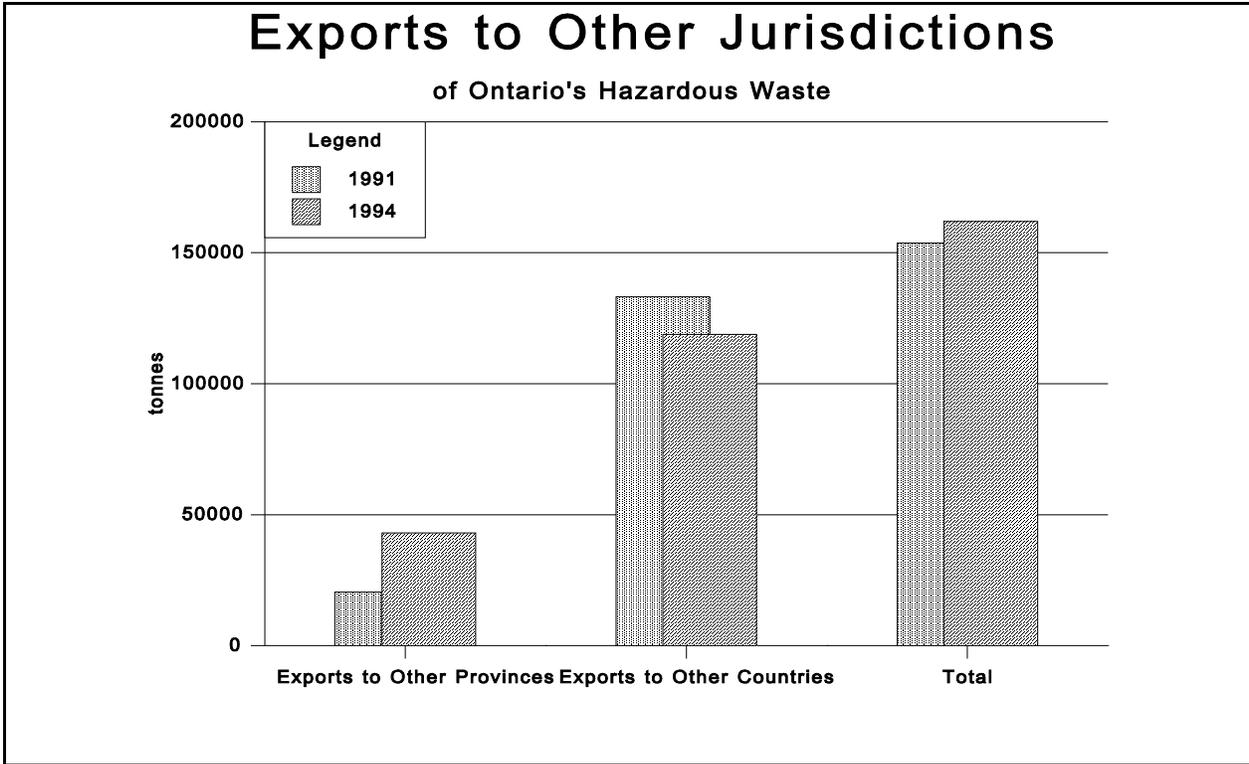


Chart 5: Ontario Hazardous waste imports from other jurisdictions (1991 – 1994)

6) Joint Board Conclusions Regarding Off-Site Disposal of Subject Wastes

In its November 1994 decision, the Joint Board concluded that Ontario did not have the capacity to deal with all of the hazardous and liquid industrial wastes being generated in the province, that there was no treader of last resort, and that the commercial final treatment and disposal marketplace is dominated by one firm Laidlaw.²⁶⁷ In fact, the Board concluded that by 1996 there would be between 75,000 and 89,000 tonnes of hazardous wastes generated in Ontario for which adequate treatment and disposal options did not exist.²⁶⁸

7) Spills

The number of spills of hazardous materials, including hazardous and other 'subject' wastes, reported to the Ministry of Environment and Energy is reported to have been "roughly static," at a rate of 5,000/yr over the period 1990-1995, the most recent for which statistics are available.²⁶⁹ The Ministry's most recent report noted that 69% of spills are significant enough to have either a possible or confirmed impact on the environment,²⁷⁰ the most common effect being soil contamination.²⁷¹

The Ministry's data indicate that most spills occur to land, involve oils, occur from a motor vehicle, principally trucks, and are the result of either equipment failure or operator error. 45% of spills are fully cleaned up, while a partial clean-up occurs to 20%. The highest clean-up rate is for spills to land, and the lowest for releases to the air.²⁷²

8) Recent Policy Initiatives

i) CCME

The Canadian Council of Ministers of the Environment (CCME), consisting of the federal, territorial and provincial Ministers of the Environment, has undertaken a number of initiatives related to hazardous waste management. In particular, the Council's Hazardous Waste Task Group (HWTG) has been working on the "harmonization" of federal and provincial definitions of "hazardous waste." At the centre of this work has been proposals for the "de-coupling" of the definitions for waste and recyclable materials. Other issues being examined include the use of leachate tests to classify environmentally hazardous and leachate toxic wastes and recyclable materials, and the need for a harmonized national listing/de-listing protocol.²⁷³

The CCME proposals regarding the "de-coupling" of the definitions for waste and recyclable materials have been particularly controversial. The rationale for this separation of definitions (provided by some governments and industries) has included the negative connotation associated with the terms "waste" and, in particular, "hazardous waste," (within the general public) which may be a barrier to realizing the full recycling potential for these materials.²⁷⁴ It has also been argued that the change would promote and facilitate recycling activities.²⁷⁵

However, serious concerns were raised by non-industry representatives regarding proposed separation of the definition of recyclable material from that of hazardous waste at a December 1996 workshop hosted by the CCME. It was pointed out that the proposal could result in handling of hazardous recyclables not being regulated, as they would no longer be defined as hazardous wastes. In addition, it was noted that, in some cases, the applicability of hazardous waste regulations is the only means of controlling recyclable hazardous wastes, or even knowing of their existence.²⁷⁶

The CCME HWTG also proposed that residences and individuals transporting household hazardous wastes to depots continue to be exempted from regulatory requirements related to hazardous wastes. More significantly, the Task Group proposed to add an exemption for interprovincial and domestic shipments of hazardous recyclable materials transported directly to a site to be wholly used in an ongoing agricultural, commercial, manufacturing or industrial process, or operation used for functions other than waste management, provided that the process did not involve combustion or land application, no distinct components of the material are recovered as separate end-products, and any of the products or emissions for the process do not contain any hazardous constituents at levels higher than would result from the use of comparable raw materials.²⁷⁷

ii) **Federal**

In addition to federal participation in the CCME HWTG process, there are a number of other federal initiatives underway regarding hazardous waste management.

CEPA Review

On December 10, 1996, the federal government introduced Bill C-74, the new *Canadian Environmental Protection Act*. The Bill is the government's response to the June 1995 report of the House of Commons Standing Committee on Environment and Sustainable Development reviewing CEPA.²⁷⁸

In its report, the Committee had recommended that CEPA and its regulations be amended to fulfil Canada's commitments under the Basel Convention to ban immediately exports of hazardous waste for disposal to developing countries, and to phase out exports for recycling/recovery to developing countries by the end of 1997.²⁷⁹

In its December 1995 response to the Committee's report, the government proposed to clarify the authority to make regulations banning exports and imports of hazardous waste to and from any country when this is required under an international agreement to which Canada is a party, and to provide the authority to refuse the export or import of a hazardous waste if the waste in question is not to be managed in an environmentally sound manner according to international agreements to which Canada is a party. In addition, the government proposed to amend CEPA to require Canadian exporters of hazardous wastes to have plans for reducing/phasing out the quantity of hazardous wastes that is being

exported for the sole purpose of final disposal as per the requirements of the Basel Convention.²⁸⁰

Provisions for the implementation of these proposals were contained in Bill C-74. The Bill also contained a clause that would permit the granting of import or export permits for an activity which "does not comply" with the provisions of the Act if the Minister is satisfied the activity will be conducted in a manner that will provide an "equivalent level of safety."²⁸¹ This provision appeared to mirror the "compliance plan" scheme contained in the government's proposed Bill C-62, the *Regulatory Efficiency Act*, which was widely criticized by public interest organizations and legal scholars.²⁸² The Bill also made provision for cost recovery by Environment Canada in the issuing of waste import/export permits.²⁸³ Bill C-74 died on the order paper when a federal election was called for June 1997. As of December 1997 the Bill had not been re-introduced into Parliament.

Basel Convention Implementation

The implementation of the September 1995 amendment to the Basel Convention to ban exports of hazardous waste to developing countries for recycling has emerged as a major issue within the federal government. Canada consistently resisted the ban,²⁸⁴ and at the September 1995 Conference of the Parties, Canada was the last Party to relinquish its opposition to the decision to ban exports for recycling.

The Technical Working Group of the Basel Convention was mandated to clarify the definition of hazardous waste developed under the Basel Convention. This definition included both wastes destined for recycling and final disposal. The development of Canada's position on the definition of waste has engendered deep conflict within the federal government. The Canadian metals and mining industries have strongly opposed the Basel ban, complaining that it will restrict metals recycling activities.²⁸⁵

In December 1995, the House of Commons Standing Committee on Natural Resources tabled an interim report on "streamlining" environmental regulation for mining in Canada. In its interim report, the Committee recommended that the federal government modify its definition of "wastes" to exclude metal recyclables. It also recommended that the federal government work to exempt materials containing metals used in recycling or other environmentally beneficial processes from the Basel Convention.²⁸⁶

In its June 1996 response to the Committee's recommendation, the government stated that it would work to remove the negative connotation given to recyclable materials associated with the term "waste," through the CCME, continue to review the definitions of "waste" and "hazard" to develop an appropriate definition of waste for use domestically and in an international context, identify recyclable materials that require controls but need not be managed as waste, and finally, remove transboundary restrictions from recyclable metals that do not pose a risk to human health and the environment and are well managed in their industrial use. In addition, it stated that it would work with the provinces and its international counterparts to apply "appropriate" movement and management controls to materials in relation to their risk to human health and the environment.²⁸⁷

In November 1996, the federal government adopted a Minerals and Metals policy that states that the government will promote in both domestic and international fora common approaches to the definition of waste that underline the need to differentiate between recyclable materials destined for recovery operations, and wastes destined for final disposal.²⁸⁸ The Minerals and Metals Policy also effectively commits the federal government to seeking to block future international environmental agreement that might interfere in international trade in metals or minerals.²⁸⁹ This again appears to be in response to the Basel ban.

NPRI Revisions

Environment Canada has proposed to add a number of reporting requirements to the NPRI. Reporting of off-site 3Rs disposal of NPRI substances is to become mandatory for the 1998 reporting year. In addition, Environment Canada is proposing that reporting requirements be established regarding waste being treated or incinerated on-site.²⁹⁰ These measures would address a number of the most significant weaknesses in the existing NPRI structure, particularly in comparison with the U.S. Toxic Release Inventory. However, Environment Canada announced in December 1997 that it was post-poning the implementation of reporting requirements regarding the on-site fate of NPRI substances, due to objections from the affected industries.²⁹¹

Cost Recovery and the CEPA Waste Import/Export Regulations

In December 1996 Environment Canada announced its intention to implement a cost recovery system for the administration of the CEPA hazardous waste import/export regulations.²⁹² However, the proposal has encountered strong resistance from the affected industries, and the implementation of the measure has been slowed significantly. In October 1997 it was reported that delays in the implementation of a cost recovery system by Environment Canada was resulting in substantial budgetary shortfalls and was likely to lead to further layoffs within the Department.²⁹³

Report of the Auditor General of Canada on the Implementation of CEPA Hazardous Waste Import/Export Regulations.

Over the past few years, there have been recurring reports of Environment Canada lacking the staff and other resources necessary to implement and enforce the CEPA regulations on the transboundary movement of hazardous wastes.²⁹⁴ In October 1997, the Auditor-General of Canada tabled a report in Parliament which raised serious questions about the effectiveness of the federal government's controls on the transboundary movement of hazardous wastes.²⁹⁵ The report focused on imports and exports of wastes to and from Canada.

The report concluded that there was a limited chance of detecting illegal traffic in

hazardous waste at the border. Inspection and effective testing of samples of potentially illegal imports and exports was found to be limited, as was the training of Customs Officers to recognize hazardous wastes. The Auditor-General also stated that there was an even lower chance of detecting illegal shipments of hazardous wastes at marine ports or rail yards.

In addition, the report noted that, due to low rates of compliance with reporting requirements, Environment Canada could not be sure that hazardous wastes exported from Canada have reached their final destination or have been properly disposed of or recycled.²⁹⁶ The Auditor-General concluded that:

"as a result of significant gaps in the areas of prevention, detection and enforcement and the limited facilities to physically control exports of hazardous waste at the border, Canada is not in a position to know the extent to which it is living up to its international obligations with regard to preventing illegal traffic at the border."²⁹⁷

The Auditor-General made a number of recommendations to improve the situation with respect to regulation of transboundary hazardous waste movements. These included: making efforts to quantify the extent of illegal traffic; improved training for Customs Officers; better sharing of intelligence between agencies and improved coordination of their actions; and the development of a management strategy for obtaining and analyzing hazardous waste samples.

The federal government departments and agencies identified in the Audit were reported as having agreed to implement the Auditor-General's recommendations.

ii) Provincial

Bill 57 -The Environmental Approvals Process Improvements Act, 1997.

Bill 57, the *Environmental Approvals Process Improvements Act*, was introduced into the Legislature in June 1996, and enacted in June 1997. The Act dissolved the OWMC and the Environmental Compensation Corporation created through the 1979 'spills' Bill. In addition, the Act amended the *Environmental Protection Act* and the *Ontario Water Resources Act* to permit the cabinet to exempt any person or activity from the requirements of either statute or regulations made under them, and to make regulations dealing with any person or activity falling under the jurisdiction of the two Acts.²⁹⁸

Responsive Environmental Protection

In July 1996, the Ministry of Environment and Energy released a series of proposals for the reform of environmental regulation in the province.²⁹⁹ These proposals affected virtually every regulation administered by the Ministry of Environment and Energy.

Regulation 347

Hazardous and Liquid Industrial Waste management was the area most heavily affected by the Ministry's proposals. The Ministry's proposals included the following measures:

- the removal from requirements for waste approvals under Part V of the *Environmental Protection Act*, and the generator registration and manifesting requirements of Regulation 347 of activities related to the handling of "recyclable materials." Specific reference was made to the exemption of activities related to the recycling of all types of batteries, thermostats, photoprocessing wastes, printed circuit boards, metal bearing sludges and waste oils sent for re-refining from waste requirements for transportation, handling and approvals.³⁰⁰
- the exemption from Regulation 347 manifesting requirements of industry operated "manufacturer controlled networks" which collect and recycle hazardous wastes;³⁰¹
- the exemption from waste approval requirements of on-site 'processing' other than combustion or land application. This may open the door to a range of unregulated physical, chemical or biological processing activities, which may have significant environmental impacts;³⁰²
- the removal of "liquid industrial wastes" from the province's definition of "subject" wastes.³⁰³ Among other things, this would likely remove the requirements to register and manifest movements of landfill leachate to sewage treatment plants;
- the removal of the requirement for generator registration of 'registerable solid waste'.³⁰⁴
- the replacement of the current manifesting requirements with annual, semi-annual or quarterly reports for movements of hazardous wastes in the range of 100 to 500 kg;³⁰⁵
- the elimination of manifesting requirements for movements of hazardous wastes between sites owned by the same proponent within a given municipal boundary;³⁰⁶
- the elimination of requirements for public hearings prior to the approval of:³⁰⁷
 - waste-derived fuel sites burning liquid industrial waste generated off-site; and
 - on-site hazardous waste incinerators.
- the establishment of a "standardized approval" system similar to that established for pesticide container and used oil depots, and refrigerant collection, recycling and

disposal facilities for:³⁰⁸

- the on-site storage of hazardous wastes, including PCB's;
- the burning of hazardous wastes generated on-site as fuel;
- dust suppression sites using subject waste;
- "selected waste depots" for such materials as pharmaceuticals, sharps, pesticides, paints, and batteries from industrial generators;
- household hazardous waste collection sites; and
- "small" hazardous waste transfer stations, including PCB transfer stations.

It is unclear whether, under the Ministry's "standardized approval" proposal, these facilities would be deemed to have an approval if in compliance with standardized requirements by the Ministry, or whether they would be exempted from the requirements of Regulation 347 and Part V of the *Environmental Protection Act* provided that the required standards are met.

In addition, the Ministry proposed to add corrosive solid waste into the Ontario definition of hazardous waste to harmonize it with federal definition for the purposes of the CEPA waste import/export regulations.³⁰⁹ The withdrawal of the exemptions that permitted the six public landfills authorized to receive 'subject' wastes granted in the early 1980's, was proposed as well.

Serious concerns were raised regarding the implications of the overall direction of the Ministry's proposals for environmental protection and public health and safety, particularly with respect to the de-regulation of hazardous waste recycling activities, especially given the potential risks to the environment and public safety associated with these activities, and the history in the province with illegal waste disposal activities taking place under the guise of 'recycling'.³¹⁰

Questions were also raised about the Ministry's proposals regarding "standardized approvals." These focussed on the adequacy and enforceability of the conditions on approvals, the level of Ministry oversight of activities which would occur under "standardized approvals," especially in light of its reduced resources, the appropriateness of applying reduced approval requirements to activities, many of which are associated with significant risks to the environment and public safety. In addition, the proposal raised significant issues related to public access and accountability for decision-making, as it is unlikely, under the current proposals, that approvals granted in this way would be subject to the public notice and comment requirements of Part II of the *Environmental Bill of Rights*.³¹¹

Despite these concerns, many of the Ministry's proposals were subsequently reiterated by the province's "Red Tape Review Commission" in its January 1997 report.³¹² The Ministry indicated its intention to proceed with the proposed amendments to Regulation 347 dealing with subject waste in November 1997, with implementation to occur early in 1998.³¹³

Municipal Industrial Strategy for Abatement (MISA) Regulations Revisions

The Ministry also proposed major revisions to the MISA industrial program regulations. These included the following:

- the removal of the requirement for the pulp and paper sector to submit reports on how to reach zero discharge of AOX³¹⁴ by 2002 and the removal of the requirement for the Ministry to review the reports against the goal of zero AOX discharge under the MISA program;
- reduce routine chronic toxicity testing requirements;
- remove reporting and monitoring requirements for substances that are not used in a facility's industrial processes; and
- reduce the frequency of monitoring and reporting under MISA for facilities that surpass effluent limits.³¹⁵

These proposals were also reiterated by the Red Tape Commission in its January 1997 report.³¹⁶ Despite expressions of serious concern from many commentators,³¹⁷ the government indicated its intention to proceed with the proposed changes to the MISA program regulations in November 1997.³¹⁸

More positively, the government proposed to develop a performance-based discharge regulation for municipal sewage treatment plant effluent.³¹⁹ However, it is difficult to envision the implementation of an effective regulation in light of the province's withdrawal of financial support for the maintenance and upgrading of sewage plants through the termination of the Municipal Assistance Program.³²⁰ Furthermore, the Ministry has provided no indication of any intention to move on the issue of industrial discharges to sewers, despite the fact that such discharges are the primary source of toxic contaminants in sewage treatment plant effluent and sludges.

Budgetary Reductions

Over the past two years, there have been major reductions in the budgetary and personnel resources which have raised serious questions regarding the province's capacity to enforce the existing regulatory framework.³²¹ In particular, the Ministry of Environment and Energy's operating budget for the 1997-98 fiscal year had been reduced by approximately 44% as measured against 1994-95, and staffing levels reduced by more than 35%.³²²

Staffing levels specifically dealing with waste management issues were reported to be reduced 57%, waste water 33% and spills 60%, at the end of December 1996, as measured against the 1994/95 fiscal year.³²³ There has also been a dramatic decline in the number of enforcement actions undertaken by the Ministry over the past two years.³²⁴

Philip Enterprises Decision and the Definition of 'Waste'

As noted earlier, a June 1997 Ontario court decision involving Philip Enterprises Ltd. concluded that only "unusable leftovers" for processing or recycling operations should be considered "waste" and therefore subject to the requirements of the *Environmental Protection Act*.³²⁵ If upheld, this ruling would exempt most activities dealing with the "recycling" or "reclamation" of hazardous and liquid industrial wastes from the current regulatory requirements.

In October 1997, the Ministry proposed to revise the definition of 'waste' in Regulation 347 in order to reverse the court's decision.³²⁶ However, at the same time, the Ministry proposed to exempt the 'recycling' of residues from electrical wire recycling operations, and of photochemical wastes, and the use of 'pickle' liquor as a treatment chemical in sewage treatment plants, from the requirements of Part V of the *Environmental Protection Act* and Regulation 347.³²⁷

Plastimet PVC Fire and the Fire Marshal's Report

The month following the *Philip* decision, a serious fire occurred at a plastics recycling plant in Hamilton, Ontario operated by Plastimet Ltd.³²⁸ The facility was operating under the exemption from the requirement to obtain a Certificate of Approval under Part V of the *Environmental Protection Act*, for municipal waste recycling facilities.³²⁹ This exemption is subject to conditions, relating to limits on the amounts of waste which could be stored on site, and the manner in which they were stored. The structure of this arrangement is similar to that which the Ministry of the Environment proposed under July 1996 proposal for a "standardized approval" system.

In his report following the fire, the Ontario Fire Marshal recommended that the requirements for recycling and waste handling facilities be significantly strengthened, including those currently considered to be exempt from the requirements of the *Environmental Protection Act*. In particular, the Fire Marshal recommended that facilities not be permitted to operate in close proximity to schools, hospitals, correctional facilities, high density residential areas and similar sensitive sites.³³⁰ In addition, the Fire Marshal recommended that sites be required to have appropriate security measures, approved fire safety plans, floor and site plans, an inventory of materials, and that company personnel be adequately trained in the fire safety plan and emergency procedures.³³¹

These events raised serious issues about the adequacy and enforceability of the existing "standardized approval" arrangement for municipal waste recycling sites. It must also add to the questions about the implications for environmental protection and public safety of the Ministry's July 1996 and November 1997 proposals to expand these arrangements to a range of activities related to the management of hazardous wastes.

Standards Revisions

In October 1996 the Ministry initiated a review of its standards for air, soil, ground water, surface water, drinking water, sediment and biota. The highest priority has been placed on air emission standards.³³² The Ministry has publicly acknowledged that its existing standards in this area are inadequate and seriously outdated for nearly a decade.³³³ New standards are to be adopted from other jurisdictions, and the path of "encouraging joint development of standards through partnerships with other regulatory agencies, the regulated community, and other stakeholders" is to be pursued.³³⁴

The initial proposals by the Ministry released in December 1996 would have significantly strengthened Ontario standards for a range of air emissions.³³⁵ However the Ministry has been criticized for its continued reliance on a "point of impingement" approach to the development of standards, and its failure to pursue the goal of the virtual elimination of emissions of persistent toxic substances, as recommended by the International Joint Commission and other agencies.³³⁶ It also remains unclear as to whether the Ministry intends to incorporate the new standards into existing Certificates of Approval, or to only apply them to new facilities.

It has been reported that the implementation of the Ministry's proposals have been delayed due to very strong objections from the affected industries.³³⁷

Cost Recovery

In November 1997, the Ministry of Environment announced its intention to impose a cost recovery scheme for generators of waste shipped off-site for disposal. The basic rate for cost recovery is \$25/tonne, capped at \$50,000/yr for generators of over 2,000 tonnes/yr, and \$250/yr for generators of between 1 and 10 tonnes/yr. A charge of \$2,000/yr would be charged for each transfer station, with a corporate maximum of \$50,000/yr. The processing of each manifest is to cost \$4. The program is to cover the costs of the Spills Action Centre, emergency response, environmental monitoring, tracking and enforcement, lab analysis and, in some circumstances, site remediation.³³⁸

At the same time, the Ministry has introduced charges for public access to the waste generator and manifest data. Data for the current year are to be available for \$150. Data for the years 1986-1995 are to be available for \$250/yr or \$1,000 for five years.³³⁹

9) Conclusions and Recommendations

It is difficult to draw clear conclusions regarding the status of hazardous and liquid industrial waste generation and disposal in Ontario, given the unreliability of some of the key data sources and the incompatibility of definitions and scope of reporting requirements under different programs, such as Ontario Waste Generator and Waste Manifest Databases, the NPRI and the CEPA Hazardous Waste/Import Export Regulations.

Many of these problems are likely to be compounded by the province's July 1996 proposal for wide-ranging revisions to its regulatory regime for 'subject' waste. A significant range of activities, particularly related to the 'recycling' of wastes was proposed to be removed from the regulatory system. The Ministry of the Environment also indicated its intention to delete liquid industrial and registerable solid wastes from the definition of 'subject' waste.

Furthermore, a standardized approval system was proposed for 'subject' waste storage sites, transfer stations, dust suppression sites, and the on-site use of waste as fuel. Reductions in reporting requirements related to spills, small shipments of 'subject' waste were proposed as well. The Ministry reiterated its intent to proceed with these changes in November 1997.

The following discussion highlights some of the most significant gaps in the existing data sources and regulatory regime for the management of 'subject' wastes in the province of Ontario. Although significant gaps exist in the available data, sufficient information has been generated through the OWMC Environmental Assessment process and other sources to indicate that there are substantial weaknesses in the current regulatory framework which require immediate attention. Recommendations for reform, to address these weaknesses, are presented as well. These proposals outline a program of action to overhaul and modernize the provincial and federal regulatory regimes 'subject' wastes in the province of Ontario.

i) Waste Generation, Sources and Composition

The most recently published estimates of total annual hazardous waste generation in Ontario, based on 1991 data, vary from 1.15 to 2.5 million tonnes, with estimates of up to an additional 1.5 million tonnes in storage. The Ontario Waste Generator Registry is potentially the most comprehensive source of information regarding hazardous and liquid industrial waste generation in the province.

However, the Generator Registry does not require updates from waste generators on a regular basis. In the course of the OWMC environmental assessment it was suggested that only 55%-60% of the registered wastes actually existed. The Provincial Auditor, on the other hand, has suggested that there may be significant under-reporting of waste generation through the registry. Nor does the registry require reporting of direct releases of 'subject' wastes to the atmosphere through such means as volatilization. 46,000 tonnes of NPRI substances were reported to have been released in this way in 1994 in Ontario.

The most serious gaps in the available data relate to the on-site management of wastes, as the Generator Registry is the only potentially comprehensive source of information available regarding the fate of these wastes. Wastes transferred off-site for disposal, recycling or use as fuel, on the other hand, are generally captured by the waste

manifesting system and reported in the Waste Manifest Database.

The problems associated with the Ontario Waste Generator and, to a lesser degree, Waste Manifest, Databases have been compounded by various exemptions from the generator registration and manifesting requirements which have been granted by the Ministry. These have included conditional exemptions for such activities as the collection of waste oil, oil filters, lubricants and anti-freeze, pesticide containers, and refrigerants, put in place over the past five years. However, the oldest, and most important exemption is that regarding activities related to the 'recycling' of 'subject' wastes.

The significance of this gap is particularly evident when the Ontario Waste Manifest Database information and NPRI data regarding off-site recycling are compared. Even though the NPRI captures fewer substances than the manifest database, deals with specific substances rather than the total waste stream, and the reporting of transfers of substances off-site for recycling is voluntary, a higher quantity, 93,000 tonnes for 1994³⁴⁰ vs. 70,000 for 1995³⁴¹ tonnes under the GRD, is reported in the NPRI data than in the waste manifest database.

Despite these weaknesses, the Ontario Waste Generator Database has a number of significant strengths over the NPRI. It is more comprehensive in terms of the range of substances and waste streams which it captures. In addition, it reports actual amounts of waste generated, rather than just releases to the air and water or transfers off-site for disposal.

Within the context of these limitations, available data lead to the conclusion that total 'subject' waste generation in Ontario is roughly stable or increasing slowly. For its part, the Environmental Assessment Board accepted an estimate that hazardous and liquid industrial waste generation in the province would increase by approximately 3% per year in its decision regarding the OWMC.

It is also possible that the increases in waste 'recycling' activities which have been reported over the past few years may be masking growth in the total amounts of subject wastes generated in the province. This potential is particularly significant in light of the gaps in the reporting of such activities under the NPRI and provincial Waste Generator Registry and Manifest Database systems.

The limitations of the available data also make accurate descriptions of the sources and composition of the hazardous and liquid industrial waste stream difficult. Heavy metal solutions, landfill leachate, organic sludges and solvents, and oil wastes appear to make up the largest components of the total subject waste stream in Ontario. The chemicals and allied products, petroleum refining, primary and fabricated metals and paper and allied products industries tend to be identified as the leading generators of hazardous and liquid industrial wastes in the province.

Given the difficulties encountered in assembling even a general impression of current rates of waste generation, sources and composition, it is clear that the available

data sources, particularly the Ontario Waste Generator Database, require major revisions. As the NPRI and CEPA Hazardous Waste Export/Import Regulations should provide a national baseline for reporting and data collection, a revised Ontario regime should seek to ensure that all substances and waste classes, and their fates, reported under the federal regimes are reported under the revised provincial requirements as well. This would greatly enhance the comparability of data, and in the longer term, facilitate the integration and consolidation of federal and provincial reporting activities.

A revised Ontario regime should also reflect a clearer approach to the definition of 'subject waste.' This should include all non-product output of designated substances and classes of substances generated by a production unit, prior to handling, processing, recycling, reuse, transfer, disposal, treatment or release. This would follow the practice of the states of Massachusetts and New Jersey for toxic use reduction/pollution prevention planning purposes.

In addition, steps are required to ensure the generation and release to the public of data and information regarding activities involving 'subject' wastes which operate under exemptions from the general approval, generator registration and manifesting requirements of the *Environmental Protection Act* and Regulation 347. This would include activities occurring under the Ministry's proposed 'standardized approval' system. This is necessary for reasons of public accountability, and the identification of significant trends or emerging problems.

A more open, and accountable process is also required regarding such issues as decisions to add or remove substances or classes of substances from the definition 'subject' waste. Currently, such decisions are only subject to the public notice and the minimum 30 day comment period required by the *Environmental Bill of Rights*. This is an inadequate means of dealing with changes to the definition. The need for reform in this area was made particularly clear by the extensive changes to the definition proposed by the Ministry, with little or no supporting documentation, in July 1996.

Recommendations:

VI-1. Waste Generator Registry Reform.

Waste generators should be required to provide an annual report of non-product output of designated substances or classes of substances prior to handling, transfer, treatment or release. The current Regulation 347 waste classes should be reviewed to ensure that they include the substances and classes of substances covered by the CEPA Hazardous Waste Import/Export Regulations (listed in Schedule II, Part III of CEPA), the NPRI, and all substances whose discharges are regulated through the MISA program. The reporting structure should seek to identify and report on the presence of specific substances within waste classes.

The fate of these non-product outputs should also be required to be reported. This would include releases to the air, water or land, underground injection and on or off-site treatment, processing, out of process recycling or reuse, incineration, use as fuel, or disposal through landfilling or other means. Annual filings should also include substances in, or sent to, storage on or off-site, and non-production related waste generation (waste that is generated as a result of one-time events, including accidental spills, facility closures and contaminated site remediation).

These filings should be made available to the public, and their contents presented by the Ministry of the Environment in a summary report on an annual basis.

IV-2. Selected Waste Depots and Other Exempted Facilities

The Ministry of Environment should establish a public registry of selected waste depots and other facilities operating under exemptions from the general generator registration requirements of Regulation 347. Such facilities should be required to file regular reports with the Ministry regarding quantities and types of wastes collected, and their fates, including storage. These reports should be made available to the public through the registry, and the contents of the reports from each type of facility presented in summary form each year.

IV-3. Waste Manifesting

Non-product output and non-production related wastes falling within the definition of 'subject' waste sent-off site for disposal, treatment, storage, export, reuse, recycling or use as fuel should be subject to the waste manifesting requirements of Regulation 347. Residues from industrial, manufacturing or commercial 'recycling,' reuse or recovery operations should also be included under these requirements.

The Ministry of the Environment should move towards the transfer of the waste manifesting and tracking process to an electronic format. This would reduce the paperwork associated with waste movements, and potentially permit the monitoring of waste movements in real time.

IV-4. Adding or Deleting Substances or Classes of Substances to or from the 'Subject' Waste Definition.

A formal procedure for dealing with proposals to add or delete substances or classes of substances from the definition of 'subject' waste should be established by the Ministry of the Environment. A multi-stakeholder advisory committee should be created to review and provide the Ministry with advice on listing and de-listing decisions. Submissions to the advisory committee, and its conclusions and

recommendations to the Ministry should be a matter of public record.

The federally operated NPRI also suffers from a number of significant gaps, and is much less comprehensive than the United States Toxic Release Inventory (TRI). The TRI, for example, requires reporting on a much larger number of substances, the quantities of substances treated on site, including the methods of treatment used, and on-site recycling. The TRI also includes mandatory reporting of shipments of substances off-site for recycling, reuse or energy recovery. Reporting on such transfers is currently voluntary under the NPRI.

In addition, the NPRI exempts mining, the distribution, storage and sale of fuel, and the retail or wholesale sale of products containing NPRI substances from reporting requirements. Reporting requirements for the metal mining, coal mining, petroleum bulk terminal, and chemical wholesaler sectors were added to the TRI in May 1997.

Furthermore, there are initiatives by both the U.S. Administration and within the Congress to lower the TRI reporting thresholds for highly toxic and persistent and bioaccumulative substances and to establish reporting requirements on the use of substances. Reporting under the TRI is also linked to facility emergency planning requirements under the 1986 *Superfund Amendment and Reauthorization Act* and 1990 amendments to the *Clean Air Act*.

Mandatory reporting for transfers of NPRI substances off-site for recycling or reuse is to be re-established for the 1998 reporting year. Environment Canada has proposed the establishment of reporting requirements regarding the on-site fate of NPRI substances, similar to those established under the TRI through the *Pollution Prevention Act* of 1990. However, the implementation of this proposal was postponed in December 1997, due to objections from the affected industries.

Beyond improving the comprehensiveness and quality of the data provided through the NPRI, upwards harmonization of the NPRI with the TRI would be consistent with Canada's obligations under the *North American Agreement on Environment Cooperation*.

Recommendations:

IV-5. National Pollutant Release Inventory

Reporting requirements should be established for all TRI substances in Canadian commerce (i.e. on the CEPA Domestic Substances List), which are not currently subject to NPRI reporting.

The re-establishment of mandatory reporting requirements for substances sent off-site for reuse, recycling or energy recovery for the 1998 reporting year should proceed.

The reporting thresholds for CEPA 'Toxic' substances and known and suspected carcinogens³⁴² should be lowered to ensure more comprehensive reporting on releases and transfers of these substances. Consideration should be given to triggering reporting requirements on the basis of amounts of these substances generated and released or transferred rather than on the amounts used in a facility.

The establishment of quantitative pollution prevention reporting requirements regarding the generation and on-site treatment of NPRI substances including quantities reused, recycled or recovered (i.e. waste derived fuel) should proceed as soon as possible.

The exemptions from NPRI reporting requirements should be revised to ensure coverage of all sectors which are currently required to report under the TRI.

The establishment of a pilot program for reporting on facility use of NPRI substances should be considered.

The establishment of a pilot program for the reporting of emergency planning activities and plans under the NPRI, similar to that which occurs under the TRI, should be considered.

ii) The Fate of 'Subject' Wastes Generated in Ontario.

The Ministry of Environment and Energy has estimated that 40% of the hazardous wastes generated in the province were disposed of on the site of their generation, through such means as discharges to sewers and surface waters, incineration, use as fuel and landfilling or landfarming. The Ministry estimates that the remaining 60% is dealt with off-site through incineration, landfilling, export, recycling, processing, and use as fuel and dust suppressants. However, the OWMC Environmental Assessment suggested that a much higher portion of hazardous wastes are disposed of on-site than are shipped off-site.

Industrial Discharges to Sewers

The leading fate of wastes managed on site is discharges to sanitary sewers. The OWMC estimated that 394,000 tonnes of subject waste were dealt with in this way in 1991. This practice is associated with a wide range of serious problems, including interference with sewage treatment plant operations, contamination of sewage sludge and treatment plant effluent, and occupational health and safety threats to plant staff. However, no provincial regulations exist controlling such discharges.

The application of a Model Sewer-Use By-Law developed by the Ministry of the

Environment nearly a decade ago is at the discretion of municipalities, and permits municipalities to enter into sewer use agreements with dischargers. These agreements allow discharges at levels higher than those prescribed in the model by-law in exchange for the payment of sewer discharge fees. The development of pre-treatment requirements for industrial discharges to sewers was proposed as part of the MISA program in the late 1980's. However, there has been little progress on the development and implementation of such standards to date.

Recommendations:

- IV-6. The province should proceed with development and implementation of pre-treatment standards for industrial discharges to sewers as proposed under the MISA program as soon as possible.*
- IV-7. In the interim, the Model Sewer-Use By-Law should be revised to include standards for persistent organic pollutants, strengthened standards regarding heavy metals, and to end the practice of permitting of sewer-use agreements.*
- IV-8. Municipalities should be required to file Annual Reports to with the Ministry of the Environment regarding permitted and estimated total industrial discharges to their sewer systems. These reports and an annual summary of their contents should be made available to the public by the Ministry.*

It is important to note that while the Ontario Waste Generator Database identifies discharges to sewers as the leading fate of hazardous wastes disposed of on-site in Ontario, the 1994 NPRI data indicate that only 1,612 tonnes of NPRI substances were disposed of in this way. In light of the OWMC's analysis of the Generator Registry Database data indicating the disposal of nearly 400,000 tonnes of subject waste to sanitary sewers each year, and the Ministry of Environment and Energy's estimates that over 1,100 tonnes of heavy metals discharged to surface waters in the effluent from Ontario sewage treatment plants annually, this suggests that there is a serious under-reporting of industrial discharges to sewers under the NPRI.

This point is further reinforced by the consideration that a total of only 2,953 facilities reported under the NPRI in 1994, while more than 12,000 industrial facilities are estimated by the Ministry of Environment and Energy to discharge into municipal sewer systems in the province. The apparent underreporting under the NRPI may be a result of a combination of failures of facilities to report their discharges to municipal sewer systems, and the possibility that large numbers of small dischargers may be falling under the reporting thresholds in terms of their use of NPRI substances or number of employees.

Recommendation:

- IV-9. The NPRI reporting requirements should be revised to ensure the more effective reporting of industrial discharges to sewers. As a first step in this regard, municipal*

governments should be asked to provide the NPRI with estimates of industrial discharges to their sewer systems on a voluntary basis.

Landfill Leachate Disposal at Sewage Treatment Plants

Sewage treatment plants are also the recipients of the largest component of the liquid industrial and hazardous waste stream dealt with off-site in Ontario: leachate from municipal landfill facilities. 430,000 tonnes of leachate were reported under the Waste Manifest Database transported to STP's for disposal in 1995. However, this figure does not include leachate generated at landfills where the leachate collection system is directly connected to a municipal sewage system. Leachate contains a wide range of contaminants, and its disposal in municipal STP's and sewer systems is associated with problems similar to those experienced with the disposal of industrial wastes. There are currently no provincial requirements regarding the quality or pre-treatment of landfill leachate prior to its disposal in sewage treatment plants.

Recommendations:

IV-10. The Ministry of the Environment should amend Regulation 347 to require the pre-treatment of landfill leachate prior to its transfer or indirect discharge through sanitary sewer systems to sewage treatment plants for disposal.

IV-11. The Ministry of Environment should require landfill operators to report to the Ministry direct leachate discharges to municipal sewer systems. The contents of these reports should be made available to the public.

Direct Discharges to Surface Waters

According to the analysis of the 1991 Waste Generator Database conducted by the OWMC, releases to water pollution control facilities, and then to surface waters, accounts for the second most significant on-site fate of 'subject' wastes generated in Ontario. 384,000 tonnes of subject wastes were dealt with in this way in that year.

It is not possible to generate a figure on the resulting total discharges to surface waters as the MISA monitoring data are not available to the public in a usable format. This problem would likely be compounded by the adoption of reductions in reporting requirements under the MISA program proposed by the province in July 1996 and reiterated in November 1997. These would reduce the frequency of reporting by some facilities, eliminate effluent limits for substances not used, produced or stored by facilities, and permit the filing of monitoring data in each facility's choice of electronic format.

Recommendation:

- IV-12. Reporting under the MISA monitoring requirements for industrial dischargers should be moved to a standardized electronic format, prescribed by the Ministry of the Environment, as soon as possible.*
- IV-13. The current frequency of monitoring requirements should be maintained. Effluent limits and reporting requirements for MISA substances designated in regulations should be maintained, except where it can be demonstrated that a substance is not used, produced, generated as a non-product output, or stored by a facility. If use, production, generation as a non-product output, or storage resumes then effluent limits and reporting requirements should be resumed.*
- IV-14. The Ministry should provide the public with annual reports on discharges to surface waters from industrial and municipal sources regulated under the MISA program, including total amounts of MISA substances, totals by sector, leading substances by sector, totals by receiving water body, and leading facilities by sector. Discharge monitoring data should also be made available to the public in a user-friendly electronic format.*
- IV-15. The Ministry should consider the application of an administrative fee to dischargers regulated under the MISA program to cover the costs of handling and processing of discharge monitoring data.*

Landfilling and Land-farming

The most recent figures available estimate that 371,000 tonnes of 'subject' wastes were disposed of at on-site landfill or landfarm operations in 1991. The number of operating on-site landfills and landfarming operations for 'subject' wastes in the province has fallen significantly over the past few years.

In addition, approximately 100,000 tonnes of subject wastes are shipped off-site for disposal at landfills or land-farming operations each year in Ontario. One commercial landfill authorized to receive subject wastes, owned by Laidlaw Environmental Services Inc, currently operates in the province. A significant expansion of this facility was approved by the Ministry of the Environment in September 1997.

In addition, six public landfills continue to be authorized through Regulation 348 to receive liquid industrial wastes, although none has done so since 1992. The Ministry of the Environment proposed to withdraw these authorizations in July 1996. This intention was reiterated in November 1997.

However, the Ministry of the Environment has not acted on its long-standing position in favour of imposing restrictions on the land disposal of hazardous wastes, including a ban on the disposal of liquid organic wastes, and the establishment of treatment standards and

concentrations for other types of hazardous organic wastes.

IV-16. The Ministry of the Environment should proceed with the implementation of restrictions on the land disposal of hazardous wastes as soon as possible.

IV-17. The Ministry of the Environment should proceed with its intention to revoke Regulation 348, which authorized certain public landfills to receive hauled liquid industrial wastes.

Incineration and Energy 'Recovery'

The OWMC estimated, on the basis of 1991 Waste Generator Database data that 112,000 tonnes of 'subject' wastes were incinerated on-site in that year. A further 500 tonnes were estimated to have been used as waste-derived fuel. As of mid-1997 55 industrial facilities had on-site facilities authorized to burn 'subject' wastes, along with nine government facilities, three universities, and a number of veterinary facilities.

54,000 tonnes of subject waste were reported under the Waste Manifest Database to have been shipped off-site for incineration in 1995. In addition, approximately 1,500 tonnes of NPRI substances were reported under the NPRI to have been transferred off-site for energy recovery (energy from waste) in Ontario in 1994.

One commercial incinerator for 'subject' wastes, owned by Laidlaw Environmental Services Inc., currently operates in Ontario. However, this facility cannot handle solids, sludges, compressed gases, halogenated solvents, PCB's, or pathological wastes.

Currently, no specific provincial emission standards exist for on- or off-site subject waste incineration or energy from waste facilities. The Ministry has stated that it is currently reviewing its air emission standards for a wide range of substances, which are widely recognized as being inadequate and out of date, although there has been little progress on this initiative to date.

Standards for hazardous waste combustion facilities, including incinerators and cement kilns that burn hazardous waste, based on the Maximum Available Control Technology (MACT) are under development by the United States Environmental Protection Agency, under the authority of the 1990 amendments to the *Clean Air Act*.

Recommendation:

IV-18. The Ministry of the Environment should develop and implement stringent emission standards for on- and off-site hazardous waste and liquid industrial waste incinerators and facilities using such wastes as 'waste derived fuel.'

Recycling/Reclamation

Reclamation or recycling account for the fate of a significant amount of the subject waste generated in Ontario, particularly used oil, solvents, and metal finishing sludges. However, as noted earlier, there are major discrepancies between the NPRI and Ministry of Environment and Energy data regarding the composition and amounts of material recycled or recovered in the province. This implies that a significant level of 'subject' waste 'recycling' activities is not being captured in the Ontario Waste Generator and Waste Manifest Databases and may suggest that the conditions of the exemption that materials be "wholly used" or packaged and offered for retail sale to meet a realistic market demand may not be being strictly applied or adhered to. The Ministry of the Environment proposed a substantial weakening of the regulatory requirements related to the recycling of 'subject' wastes in July 1996. These proposals were reiterated in November 1997.

It is important to highlight that the "recycling" of hazardous and liquid industrial wastes can be associated with significant environmental and safety problems. These include the possibility of explosions or fires at recycling facilities and occupational health and safety risks. In addition, recycling activities may result in the release of hazardous pollutants into the air and water, or generate significant amounts of sludges and other wastes which are themselves hazardous. This is particularly true of reclamation processes for used oil and solvents, as these activities focus on the removal of contaminants from such wastes. The need for stronger regulation of recycling sites was stressed in the recommendations of the Office of the Fire Marshal in the aftermath of a July 1997 fire at Plastimet Ltd. plastics recycling site in Hamilton.³⁴³

Recommendations:

- IV-19. The current exemption for the 'recycling' of hazardous and liquid industrial wastes from the requirements of Part V of the Environmental Protection Act and Regulation 347 should be reviewed and consideration given to its withdrawal. This would make all hazardous and liquid industrial waste recycling sites and related transfer stations and other facilities subject to requirements to obtain Certificates of Approval, manifest movements of materials to and from sites, including movements of residuals, and the proposed revised waste generator reporting regime regarding on-site disposal, release or transfer of residues from their operations.*
- IV-20. The Ministry of the Environment should develop a policy and guidelines for the approval and operation of all hazardous and liquid industrial waste recycling sites and facilities. These specifically should address:*
- training and certification of operators and staff, with requirements for regular re-certification. Training requirements should focus on regulatory requirements, occupational health and safety, and fire and spills protection and response;*

- *limits on quantities which may be stored on-site at any given time and requirements regarding storage practices;*
- *requirements for planning and the necessary equipment to respond to spills and other emergencies;*
- *requirements regarding facility location, including prohibitions on the location of sites in close proximity to schools, hospitals, correctional facilities, high density residential areas and similar sensitive sites;*
- *the adoption of a policy that an approval not be granted unless there is confirmation from the local fire department that the facility is in compliance with fire safety requirements, including appropriate security measures, an approved fire safety plan, floor and site plans, an inventory of materials, and personnel adequately trained in the fire safety plan and emergency procedures; and*
- *Facilities should be required to provide regular reports to the Ministry of the Environment regarding the amounts of materials stored on-site. These reports should be available to the public.*

IV-21. All hazardous and liquid industrial waste recycling sites should be listed in the public registry proposed in Recommendation IV-4.

Processing

"Processing" accounted for the fate of 285,000 tonnes of wastes shipped off-site for disposal in Ontario in 1995. In the course of the OWMC environmental assessment it was argued that current domestic physical/chemical treatment facilities are "rudimentary" and not adequate to handle current and projected waste hazardous wastes in Ontario. The Joint Board did not appear to dispute this conclusion in its decision.

Processing sites raise many of the same safety and environmental issues associated with recycling sites. They may involve the storage of significant amounts of materials for extended periods, with the associated potential for fires or spills. Such sites may also be associated with significant levels of emissions, and the generation of sludges or residues which require special handling.

IV-22. The Ministry of the Environment should develop a policy and guidelines regarding the approval of 'subject' waste processing sites and operations similar to those proposed in recommendation IV-20 for 'recycling' sites and operations.

Dust Suppression

The use of waste oil for dust suppression in Ontario was banned in 1988 due to

concerns over the presence of PCB's in such oil. This resulted in a significant drop in the use of 'subject' waste for dust suppression. The OWMC estimated that in 1991, the 29,000 tonnes of 'subject' waste were disposed of on-site as dust suppressants. The 1995 Waste Manifest Database indicates that 17,000 tonnes of 'subject' wastes were used off-site as dust suppressants in that year.

The materials currently disposed of through use for dust suppression include ammonium lignosulphonate, spent pulping liquor (sodium carbonate) and "line flush" or "line wash" oils from petroleum refineries. Concerns have been raised regarding the use of these materials as dust suppressants, as they are eventually washed off roads into ditches, and carried into watercourses. In the effect, the use of 'subject' wastes as dust suppressants amounts to their direct release into the environment.

Recent shifts to improve end-of-process water pollution control including, in some cases, the adoption of closed loop systems, as a result of the MISA program, has resulted in increases in the amounts of sludges requiring disposal. This has been especially true in the case of the pulp and paper sector. The increased use of these sludges for dust suppression has raised public concerns, as demonstrated by the "Dombind" controversy, given the wide range of contaminants that they contain.

In addition to the environmental concerns related to "Dombind," there appears to be no statutory basis for the agreement between Domtar and the Ministry exempting this material from the requirements of Part V of the *Environmental Protection Act* and Regulation 347.

Recommendation:

IV-23. The Ministry of the Environment should not approve further on- or off-site uses of 'subject' wastes as dust suppressants. Existing uses should be phased out as soon as possible.

iii) Waste Import/Export

Total imports of hazardous wastes into Ontario have increased significantly over the past few years, due to a dramatic growth in imports from the U.S. In fact, imports of wastes from other provinces, have declined significantly. Ontario is now the overwhelming Canadian recipient of exports of TRI substances from the U.S. This growth is reported to be largely due to increased imports of metals for recycling.

Exports of hazardous waste from Ontario appear to be roughly stable. There is an upward trend in exports to other provinces, while exports to the United States are declining. These trends may be due to the opening of treatment and disposal facilities in other provinces, particularly in Alberta and Quebec, to Ontario wastes.

There are differences in the range of materials covered by the Ontario waste manifesting requirements and the requirements of the CEPA Hazardous Waste

Import/Export Regulations. This can make reconciling data available from these sources difficult. The Ontario system requires, for example, manifesting of "liquid industrial wastes" and "registerable solid wastes" which are not covered under the federal regulations. The federal regulations, on the other hand, require manifesting for "corrosive solid wastes," which are not covered by Ontario Regulation 347, and "recyclable materials," which again are not covered by the Ontario requirements under certain circumstances.

Recommendations IV-1 and IV-3 indicate that Ontario should revise its Waste Generator Registration and Manifesting requirements to ensure that all classes of waste and recyclable materials covered by the CEPA Hazardous Waste Import/Export Regulations, specifically listed in Schedule II, Part III of CEPA, are included in the Ontario requirements.

Public notice of proposed waste imports and exports is required under CEPA. However, notices are limited to publication in the *Canada Gazette*. This makes timely public access to this information difficult. Environment Canada is prepared to provide members of the public with summaries of data generated through the CEPA Hazardous Waste Import/Export Regulations, although unlike Ontario, direct access public access to the data is not available.

IV-24. The public notice and public reporting requirements re: CEPA Waste Import/Export Regulations should be revised. Consideration should be given to posting waste import/export notices on an electronic registry, and making waste import/export data available to the public in a timely and user-friendly electronic format.

In March 1994 the parties to the Basel Convention on the Transboundary Movement of Hazardous Waste agreed to amend the Convention to ban immediately exports of hazardous wastes from developed to developing countries for disposal. Furthermore, at the September 1995 Conference of the Parties, the Basel Convention was amended to ban the export of hazardous wastes for disposal, recycling or recovery from developed to developing countries as of January 1, 1998. Canada has yet to ratify these amendments.

Canada has also failed to implement provisions of the Convention that exporters of hazardous waste be required to demonstrate the reasons for the export of waste for disposal. Provisions related to this requirement were contained in Bill C-74, the revised *Canadian Environmental Protection Act*, introduced into Parliament in December 1996.³⁴⁴ However, the Bill died on the Order Paper when the June 1997 federal election was called and, as of December 1997, had not been reintroduced into Parliament.

Recommendations:

IV-25. The federal government should ratify the amendments to the Basel Convention banning the export of hazardous wastes for disposal or recycling to developing countries through amendments to CEPA Waste Import/Export Regulations as soon

as possible.

IV-26. The federal government should proceed with the proposed amendments to CEPA to require that exporters of hazardous wastes from Canada have plans for reducing/phasing out the quantity of waste that is being exported for final disposal.

Serious concerns have also been raised regarding the federal government's capacity to enforce the CEPA Hazardous Waste Import/Export Regulations. This was reflected in the Auditor-General of Canada's April 1997 report on the control of the transboundary movement of hazardous wastes, which concluded that Canada was not in a position to know the extent to which it is living up to its international obligations with regard to preventing illegal traffic at the border.

Environment Canada did not dispute the Auditor-General's findings, and has indicated its intention to proceed with the implementation of report's recommendations.

Recommendation:

IV-27. Environment Canada and other affected agencies should proceed with the implementation of the recommendations of the Auditor-General of Canada regarding the administration and enforcement of the CEPA Hazardous Waste Import/Export Regulations as soon as possible.

iv) Spills

No significant trends appear to be emerging in terms of the rates of spills of hazardous and liquid industrial wastes and other environmentally hazardous materials. These remain stable at a rate of approximately 5,000 per year. The Ministry has stated that 69% of spills have the potential to have a significant impact on the environment. Ministry staff responsible for spills response has been reduced by 60% over the past two years.

Reductions in reporting requirements for 'minor' spills were proposed by the Ministry of the Environment in July 1996. These proposals were reiterated in a slightly modified form, requiring firms to keep records of spills for which reporting is no longer required, in November 1997.

Recommendation:

IV-28. The current spills reporting requirements should be retained. In addition, the Ministry should adopt a policy and guideline regarding spills management planning and training. Compliance with the guideline should be a condition of the granting of new or amended Certificates of Approval for facilities or systems which generate or handle 'subject' wastes. These requirements should be phased in for existing

facilities or systems as soon possible.

v) Pollution Prevention and Hazardous Waste Reduction

The province and the federal government are currently relying almost entirely on voluntary programs to promote hazardous waste reduction. At the same time, the technical assistance programs for such activities have been reduced significantly over past two years.

Serious questions have been raised regarding this reliance on voluntary measures, particularly the development of formal MOU's between Ministry of Environment and Energy, Environment Canada and individual sectors and firms. Such agreements are seen by some as a return to the "control order" regime of negotiating environmental requirements with firms on a case-by-case base.³⁴⁵ However, the contemporary agreements, unlike the control orders of the past, are not legally enforceable.

There are also serious issues regarding the cost-effectiveness of negotiating agreements with individual firms (in comparison with other approaches including the use of sector wide negotiations) and particularly given dramatic reductions in Ministry staff over the past two years. The concerns about this approach have been reinforced by the Ministry's recent proposals to reduce regulatory requirements on firms participating in these agreements in exchange for commitments to pollution prevention activities. Furthermore, the Ministry's July 1996 proposals for the wide ranging de-regulation of activities related to the recycling of 'subject' wastes were presented as part of its efforts to promote voluntary action by industry.

The Ministry of the Environment's almost total reliance on voluntary measures to promote of hazardous waste reduction and pollution prevention is in strong contrast with that taken by many U.S. states over the past decade. In the late 1980's and early 1990's a number of states adopted pollution prevention/toxics use reduction legislation requiring some form of pollution prevention/toxic use reduction planning by facilities. The Massachusetts and New Jersey programs, for example, employ a 'materials accounting' model with respect to the use of designated substances. These programs have produced significant reductions in the use and release of toxic substances, and cost savings to the affected firms.

Recommendations:

IV-29. Ontario should enact a Pollution Prevention Planning Act. This should be based on the Massachusetts and New Jersey models of materials accounting and planning, and integrated with the revised waste generator registration and reporting requirements.

VI-30. A pollution prevention planning and research centre, based on the model of the Massachusetts Toxics Use Reduction Institute, should be established to facilitate the implementation of the Pollution Prevention Planning Act. Its functions should include training, the provision of technical assistance, and program evaluation.

vi) Hazardous Waste Charges/Cost Recovery

A number of jurisdictions in the United States and Western Europe have adopted systems of charges or taxes on the generation or disposal of hazardous wastes. These charges are intended to both encourage waste reduction and, in some cases, provide revenue for the operation of hazardous waste programs.

There are constraints on the application of such charges at the provincial level in Canada, as a result of the constitutional limits on the use of indirect taxes. The charges levied by a province must reflect some actual cost to the province, in terms of program administration, services provided, or potentially, environmental externalities. The federal government generally is not subject to these limitations in its application of taxes or charges.³⁴⁶

In November 1997, the Ministry of the Environment proposed a cost recovery regime for its 'subject' waste program, based on a charge on waste generators of \$25/tonne and \$2,000/yr per transfer station and \$4 per manifest. The proposed charges would be capped for large and small waste generators.

Environment Canada also has indicated its intention to proceed with the implementation of a cost recovery regime for the administration of the CEPA waste import/export regulations.

The application of such charges may provide disincentives to waste generation and transboundary waste traffic. They may also establish a means of maintaining current programs, and financing important new activities. However, serious concerns must be raised about the long-term implications of regulatory agencies becoming dependent on the activities, which they are to regulate, for operating resources.

In the case of the province, the application of a waste charge to promote waste reduction should be strongly supported in principle. However, the core regulatory functions of the Ministry of the Environment, such as approvals, inspections, monitoring and enforcement, should not be dependent on the revenues generated by such charges. These activities are basic governmental functions related to the protection of public goods, which should be supported through general tax revenues.

Rather, the revenues from a waste charge should be employed to finance capital activities, such as contaminated site remediation, spills response and remediation, and waste reduction/pollution prevention technology programs. In the longer term, the charge should be designed to capture the environmental externalities associated with the generation and disposal of 'subject' wastes. These revenues related to these wider environmental costs should be returned to general revenues, and could be accompanied by off-setting reductions in other forms of taxation.

In addition to the issue of the dependance of regulatory functions on cost recovery revenues, the Ministry of the Environment's current proposal suffers from a number of weaknesses in its design. These include the apparent limitation of the proposed charge to wastes transferred off-site for disposal, which provides an incentive to on-site disposal, rather than waste reduction, and the capping of charges for large scale generators.

Recommendations:

IV-31. The Ministry of the Environment should implement a charge on the generation of 'subject' wastes on a per tonne basis. This should:

- cover the total amount of 'subject' waste generated by a site regardless of whether it is disposed, treated, recycled, or stored on or off that site. There should be no cap on the total charge for large waste generators; and*
- seek to recover the costs of administration of the pollution prevention planning program outlined in Recommendations IV-29 and IV-30, the revitalization and delivery of other pollution prevention/hazardous waste reduction technology and skills development and diffusion programs provided by the province, 'orphan' contaminated site remediation, spills response and remediation, and the capital costs of transferring the waste manifest system to an electronic format as proposed in Recommendation IV-3.*

IV-32. The resources released through the financing of the activities outlined in Recommendation IV-31 through the application of a hazardous waste charge should be employed to strengthen staffing levels within the Ministry related to hazardous and 'subject' waste management, particularly in the areas of standards development, monitoring, enforcement, and reporting.

IV-33. Consideration should be given to varying the charge on the basis of the nature of waste generated to provide incentives to reduce the generation of high priority waste substances and streams such CEPA "Toxic" and substances identified in the Canada-Ontario Agreement on the Great Lakes Ecosystem Basin Agreement and Canada-U.S. Great Lakes Binational Toxics Strategy.

The Ministry of the Environment has also introduced substantial charges for public access to the Waste Generator Database and Waste Manifest Database data. These charges are a significant barrier to public access, and inconsistent with the principles of public and community right to know, and public accountability.

Recommendation:

IV-34. The Ministry of the Environment should terminate its charges for public access to

Waste Generator Database and Waste Manifest Database Data.

The federal government has much wider authority than the province regarding the application of environmental charges and taxes. However, as with the province, core regulatory functions should not be placed in a position of dependence on such charges, except as an option of last resort.

vii) Treatment and Disposal Capacity

In its decision regarding the OWMC, the Environmental Assessment Board concluded that by 1996 there would be between 75,000 and 89,000 tonnes of hazardous waste generated in the province for which adequate treatment and disposal options did not exist. This situation may have been partially alleviated by the expansion of the Laidlaw landfill facility in Sarnia. However, the province continues to rely on export, or storage, for the management of wastes which cannot be incinerated or otherwise disposed of at existing Ontario facilities. This leaves the province vulnerable to the possibility of the closure of the borders of receiving jurisdictions to waste import at some point in the future. This point is highlighted by recent developments in Alberta and the U.S.

Regulatory changes, such as the imposition of restrictions on the land disposal of wastes, the establishment of pre-treatment standards for industrial and landfill leachate discharges to sewers, and a ban on the use of 'subject' wastes as dust suppressants, may have significant effects on the demand for treatment and disposal facilities. However, this demand will depend upon the degree to which waste generators respond through pollution prevention initiatives, as opposed to seeking off-site disposal. Capacity will continue to be required to deal with non-production wastes, such as wastes generated as a result of facility closures, and contaminated site remediation or spills clean up. Means will also need to be found to deal with the estimated 40,000 tonnes of CFC's which will require treatment and disposal as a result of the phase out of these substances in the province.

Over the past few years, the Ministry has significantly weakened the approval requirements for 'subject' waste disposal facilities. As a result of amendments made to Regulation 347 in 1993, the requirements of Part V of the *Environmental Protection Act* for public hearings prior to approval only apply to on and off-site waste disposal facilities involving incineration or landfilling. Public hearings are not required for the approval of other types of disposal operations.

Furthermore, Regulation 206/97, adopted in May 1997, eliminated the requirement for public hearings for landfill and incineration facilities under the *Environmental Protection Act* if the undertaking is designated under the *Environmental Assessment Act* and the Minister chooses not to require a hearing under that Act.

In the absence of an overall provincial strategy and policy framework regarding the management of 'subject' wastes, particularly with respect to pollution prevention and waste reduction, and the potential environmental impacts of 'subject' waste disposal facilities, serious questions must be raised about the Ministry's steps to reduce opportunities for

public input and involvement in approval of new disposal facilities.

IV-35. Regulation 347 should be amended to eliminate the exemption from public hearings prior to approval of new or expanded on or off-site subject waste disposal facilities other than incineration or landfilling. The approval of all new or expanded disposal facilities should be subject to public hearing requirements. The automatic waiving of the public hearing requirements under the Environmental Protection Act for disposal facilities designated under the Environmental Assessment Act, for which no hearings are required under that Act, should also be withdrawn.

The provincial government has normally designated new or expanded commercial disposal facilities for 'subject' wastes under the *Environmental Assessment Act*. However, this has not been established as a legal requirement.

IV-36. The Ministry of the Environment should adopt a regulation under the Environmental Assessment Act requiring the environmental assessment of new or expanded commercial disposal facilities for 'subject' waste.

viii) Conclusions

This review has revealed major gaps in the available data, and underlying regulatory framework, regarding generation, sources, and fates of hazardous and liquid industrial wastes in Ontario. In many cases these gaps are in areas where there is evidence of serious problems, such as 'recycling' activities and industrial discharges to sewers. The recent proposals by the Ministry of Environment to revise the regulatory regime for hazardous and liquid industrial waste management seem likely to exacerbate many of the weaknesses which have been identified through this review. As a consequence, the bulk of these proposals should not proceed.

Rather, what is required, and reflected in the recommendations in this chapter, is a thorough overhaul and modernization of the province's regulatory framework for the management hazardous and liquid industrial waste. This would seek to fill the major gaps in the existing data and regulatory structure and thereby strengthen the protection of public safety and the environment, improve public access to data regarding the management of 'subject' wastes in the province, and promote waste reduction/pollution prevention. A number of recommendations regarding the federal regulatory regime for hazardous wastes as it affects Ontario have also been presented.

V. POLYCHLORINATED BIPHENOLS (PCBs)

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1) Introduction

PCB's are synthetic chlorinated compounds that have been used in electrical and heat transfer equipment since the 1930's. In the 1960's and 70's scientific evidence emerged that PCB's were harmful to human health and toxic to some aquatic species, accumulated in animal tissues, and were persistent in the environment.³⁴⁷ More recently, PCB's have been associated with the disruption of endocrine systems in humans and animals.³⁴⁸

2) Regulatory Framework

i) Federal

The manufacture, importation and most non-electrical uses of PCB's were banned in Canada in 1977 through regulations made under the *Environmental Contaminants Act*. These regulations were subsequently amended to prohibit the use of PCB's as a constituent of prescribed electrical equipment manufactured or imported into Canada after July 1, 1980. The sale of any type of equipment containing greater than 50 parts per million by weight of PCBs waste was banned in 1985.³⁴⁹

In 1990, PCB waste export regulations were made under the *Canadian Environmental Protection Act* (CEPA) prohibiting the export on any PCB waste, except to the United States, where there is a requirement for the prior consent of the United States Environmental Protection Agency. Regulations governing the storage of PCB's were made under CEPA in 1992.³⁵⁰ Both regulations followed Interim Orders issued after a 1988 fire at a PCB storage site in Quebec.³⁵¹

ii) Provincial

Regulation 362 under the *Environmental Protection Act* deals with PCB storage sites. The regulation does not apply to equipment containing PCB's that is still in service. Regulation 362 exempts PCB storage sites from the requirement for a certificate approval under Part V of the *Environmental Protection Act*.

However, PCB storage sites must be operated in accordance with "director's instructions." Furthermore, no PCB waste can be disposed of, received or shipped off site, without "director's instructions." "Director's instructions" are issued by district offices of the MoEE.³⁵² PCB storage and handling activities have consistently been the subject of major enforcement actions by the Ministry.³⁵³

Regulation 352 under the *Environmental Protection Act* sets requirements for the establishment and operation of mobile PCB destruction facilities. The process was established following the recommendations of the June 1985 report of the Commission on the Regulatory Control of Mobile PCB Destruction Facilities.³⁵⁴ Public hearings are required before the Environmental Assessment Board prior to the approval of PCB incineration or

landfilling processes.³⁵⁵ Hearings on other types of destruction processes are at the discretion of the Ministry.³⁵⁶ The first mobile PCB incineration facility in Ontario was approved by the Environment Assessment Board in May 1990,³⁵⁷ to destroy PCB wastes at a former PCB transfer station at Smithville, Ontario.³⁵⁸

Case Study: 144587 Canada Inc.

On June 23, 1992, the numbered company 144587 Canada Inc., and its director, Jean Guy Pronovost, were fined a total of \$225,000 for offences relating to the improper storage of PCB waste contrary to an MOE Regulation.

The Ministry of the Environment received a complaint about the improper storage of PCBs on the company's site in Reeves Township. Acting on the complaint, an inspection by a provincial officer revealed that the lock on the compound leading to the PCB storage area was broken. The door to the interior of the compound was also broken. Two large transformers and

approximately 1,900 capacitors (devices used to store electric charges, all containing high-level PCB oils) were stored inside the compound. The defendants, who are residents of Quebec, did not respond to the Ministry's requests to secure the site and provide records.

The site had been vandalized once before and this had led to charges against Mr. Pronovost and his company.

Excerpted from: Offences Against the Environment: Environmental Convictions in Ontario 1992 (Toronto: Ministry of the Environment, 1992), pp.11-12.

3) Current Status of PCB De-Commissioning, Storage and Disposal in Ontario

Ontario has lacked adequate destruction facilities for PCB's, and the United States banned the import of PCB's in 1982. Consequently, since the early 1980's, growing amounts of PCB's have been held in storage in the province as electrical and other equipment containing PCB's reached the end of their service life. As of April 1995,³⁵⁹ the Ministry of Environment and Energy reported that there were 1,723 active PCB storage sites in Ontario, containing 13,360.655 tonnes of high level PCB's³⁶⁰ and 92,859.146 tonnes of low level PCB's.³⁶¹

The low level (<1000 ppm) PCB's in storage included 80,000 tonnes of soil, 9,000 tonnes of soil in 23,087 drums, 2,400 tonnes of bulk liquids, 720 tonnes of other materials in 5,002 drums, 186 tonnes of liquid in 2,875 transformers, and 103 tonnes of other materials not in drums.³⁶² All of these wastes are stored on the property of their owners, as there are no approved commercial storage sites in the province.³⁶³

More recently, a November 1996 report under the *Canada-Ontario Agreement on The Great Lakes Ecosystem* gives a total baseline estimate of 144,200 tonnes of PCB's in the province, consisting of 29,200 tonnes of high level PCB's in service or storage, and 115,000 tonnes of low level PCB's in storage.³⁶⁴ The total amounts of PCB's requiring destruction is expected to rise as old transformers and other equipment and materials containing PCB's are taken out of service.³⁶⁵

As of December 31, 1995, 42% of high level PCBs in service had been decommissioned and 7% of a baseline total of 18,600 tonnes of high level PCB's in storage had been destroyed, largely through shipment to the Alberta Special Waste Management Corporation facility at Swan Hills Alberta.³⁶⁶ In addition, 15% of the low-level PCB's in storage had been destroyed,³⁶⁷ largely by mobile incinerators, although some

have been shipped to the Swan Hills facility for destruction as well.³⁶⁸

4) Recent Developments

In October 1995, the United States instituted an interim relaxation of its ban on the import of PCB's for destruction. This was followed by a permanent amendment in March 1996. In response, in November 1995 the federal Minister of the Environment made an Interim Order under the CEPA prohibiting PCB waste exports to the United States for disposal. This Interim Order was extended in February 1996,³⁶⁹ but was then withdrawn, under intense pressure from Canadian firms with PCB's in storage and U.S. disposal companies³⁷⁰ in February 1997. This was despite concerns about the environmental safety of some of the U.S. destruction facilities that wished to import Canadian PCB's. The Interim Order was replaced with a regulation permitting exports for incineration or chemical destruction.³⁷¹ However, in July 1997, a U.S. Court overturned the Environmental Protection Agency's decision to permit PCB imports for destruction.³⁷²

The Swan Hills hazardous waste facility, the other significant destination for PCB exports from Ontario has also been the subject of controversy. Concerns have been expressed regarding the risks associated with the long-distance transport of PCB's and other hazardous wastes from Ontario and elsewhere to the facility for disposal.³⁷³ Furthermore, in October 1996 there was a leak of toxic substances, including PCB's, from the facility, resulting in significant contamination of the surrounding environment.³⁷⁴ This was followed by a serious explosion at the facility's incinerator, again resulting in releases of PCB's and other toxic substances in July 1997.³⁷⁵ The plant's operator has stated that the incinerator is unlikely to be re-opened for several months.³⁷⁶ Shipments of federal PCB wastes to the facility were suspended in August 1997 as a result of these incidents.³⁷⁷

In the meantime, a mobile, non-incineration PCB destruction process developed by ECO LOGIC International was approved for use in the destruction of both high and low level PCB wastes by the Ontario Environmental Assessment Board in November 1996.³⁷⁸ In April 1997, ECO LOGIC and Toronto Hydro proposed to consolidate in a single location and destroy existing PCB's stored by Toronto Hydro, the City of Toronto, and "other public and private organizations" at 160 locations around the city.³⁷⁹ A mobile low temperature chemical destruction process for transformer PCB wastes developed by Ontario Hydro has also been approved for use in the province.³⁸⁰

However, there has also been evidence of growing exports of PCB wastes from Ontario to landfill³⁸¹ and incineration facilities in Quebec.³⁸² Quebec weakened its standards regarding the handling of PCB contaminated soil in the fall of 1997.³⁸³ The import of PCB contaminated soil from Ontario for incineration has prompted a significant controversy in Quebec.³⁸⁴

In November 1997, the Ontario Environmental Assessment Board approved a permanent PCB incineration facility in Cramahe Township, outside of Colborne, Ontario, to be operated by Gary Steacy Dismantling Ltd. The facility, which is a metals reclamation furnace, is to be permitted to bring up to 18,000 tonnes of waste transformers, 700 tonnes of waste fluorescent light ballast and 1.8 million litres of transformer fluids, containing up to 500 parts per million of PCBs, to the site each year.³⁸⁵

In its decision regarding the facility, however, the Environmental Assessment Board questioned why it had not been designated under the *Environmental Assessment Act*, particularly in light of the approval of ECO LOGIC's non-incineration PCB destruction technology the previous year.³⁸⁶ The Board also noted the absence of intervenors in its hearings regarding the project, and expressed concerns about the adequacy with which health risk issues regarding the facility had been addressed, and the proponent's lack of previous experience in the handling and disposal of hazardous wastes.³⁸⁷

In July 1996, the Ontario Ministry of Environment and Energy proposed a number of changes to the regulatory framework for PCB's. These included eliminating requirements for mandatory public hearings prior to the approval of non-incineration mobile PCB waste destruction systems and sites, placing approvals for PCB consolidation and transfer sites on a "standardized approval" system, and eliminating certain categories of PCB's from the current Ontario definition.³⁸⁸ In November 1997, the Ministry stated its intention to proceed with these proposals in early 1998.³⁸⁹

5) Conclusions and Recommendations

The most recent (November 1996) estimates available indicate that there is approximately 29,000 tonnes of high level PCB's in service or storage, and 115,000 tonnes of low level PCB wastes in storage in Ontario. The Ministry of the Environment's most recent figures indicate that there are over 1,700 active PCB storage sites in the province.

The situation regarding the disposal of PCB's in Ontario has undergone a number of rapid changes over the past few years. The borders of both Alberta and the United States have been opened, and then closed, to PCB exports for destruction from Ontario, and elsewhere in Canada. It was anticipated that export would provide a primary means through which the destruction of Ontario's existing stocks of PCB's would occur. However, with the removal of the export option, there was an apparent shift to place a greater emphasis on the use of mobile, non-incineration destruction technologies, such as those developed by ECO LOGIC and Ontario Hydro.

More recently, however, there has been evidence of increasing exports of Ontario PCB wastes to Quebec for disposal. Concerns have been raised regarding the adequacy of the environmental standards which apply to PCB incineration facilities in that province.

In addition, a new, permanent PCB incineration facility, located in Cramahe Township was approved by the Ontario Environmental Assessment Board in November 1997. This facility was not subject to review under the *Environmental Assessment Act*, although the Environmental Assessment Board highlighted the implications of its establishment for the use of non-incineration technologies, which are associated with much lower emissions, as a significant policy issue.

Recommendation:

V-1. *The Ministry of the Environment should adopt a policy regarding the export of PCB's*

for destruction. This policy should be based on the principle that exports of Ontario PCB's for disposal at facilities which would not meet Ontario standards regarding transportation, handling, storage and destruction technology not be approved.

- V-2. *A regulation should be adopted under the Environmental Assessment Act, designating all new commercial PCB incineration facilities for review under the Act.*

The Ministry of Environment and Energy indicated its intention to implement extensive changes to Ontario's regulatory framework for PCB's first proposed in July 1996 in early 1998. These include eliminating requirements for mandatory public hearings prior to the approval of non-incineration mobile PCB waste destruction systems and sites, place approvals for PCB storage consolidation and transfer sites on a "standardized approval" system, and eliminate certain categories of PCB's from the current Ontario definition.

Given the long history in Ontario with failed, and subsequently costly, hazardous waste treatment technologies in the province, and the use of new non-incineration technologies consequently involve a significant degree of risk, first uses of these technologies should remain subject to a requirement for a public hearing before the *Environmental Protection Act*.

Recommendations:

- V-3. *Public hearing requirements should continue to apply for all first uses of non-incineration PCB destruction technologies. Where a first use is approved, public hearings regarding subsequent uses should be at the discretion of the Ministry, with hearings being required if requested by residents or the municipal council of the proposed host community.*

The Ministry's proposal regarding the establishment of a "standardized" approval regime for on-site PCB storage sites, and PCB consolidation and transfer sites is also of serious concern. Consideration must be given to the history of significant violations of environmental law and regulations in relation to such sites over the past few years, and the problems related to accountability and enforceability which have been raised regarding the "standardized approval" model, particularly in light of the Plastimet fire.

- V-4. *A certification of approval should be required for the establishment of on-site PCB storage sites, and PCB consolidation and transfer sites. A guideline for site consolidation activities should be developed to facilitate the approval of such activities.*

The Ministry has also failed to provide a rationale for the removal of certain classes of PCB's from the Ontario definition, other than harmonization with federal requirements.

Presumably there was some rationale for the inclusion of these types of PCB's when the Ontario definition was developed.

V-5. *The Ministry of the Environment should provide a clear scientific rationale for the proposed removal of mono and dichloride PCB's from the Ontario definition of PCB's prior to proceeding with this proposal. More generally, the Ministry should establish a clear process for dealing with proposals to remove categories of PCB's or other 'subject' wastes from the current Ontario definitions, as proposed in Recommendation IV-4.*

VI. WASTE PESTICIDES

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1) Introduction

There are a number of circumstances under which a pesticide may become a waste. The pesticides held by commercial vendors, applicators or farmers may be de-registered (banned) under federal or provincial legislation, may become ineffective due to changing pest populations, inappropriate due to changes in crops, become outdated or unusable, or their need for their use may be eliminated due to the adoption of alternative pest management practices.

The information available on waste generation and disposal in relation to pesticides in Ontario is extremely limited. It was estimated that as early as 1974, approximately 1.5 million pounds of empty pesticide containers were disposed of in landfills, and another 2.7 million pounds of liquid pesticide wastes were incinerated in the province.³⁹⁰ Disposal problems at pesticide formulating plants have also been sources of surface and groundwater contamination in Ontario.³⁹¹

The focus of this discussion is on waste pesticides from agricultural and commercial urban applications. The situation with respect to waste household pesticides is discussed in the chapter of this report dealing with household hazardous wastes.

2) Regulatory Framework³⁹²

i) Provincial

The *Pesticides Act* is the province's primary legislation dealing with the use, transportation, storage, and disposal of pesticides. Under the Act, empty containers for pesticides classified under Schedules 1, 2, and 5 of the Act, must be decontaminated in a manner approved by the MoEE,³⁹³ punctured, and buried under 50 cm. of soil that is not near any watercourse or water table.³⁹⁴ Where the container is cardboard or paper, it must be burned away from roads, buildings, or the public.³⁹⁵ Apart from these provisions, the Act is silent on the disposal of pesticide wastes.

The *Pesticides Act* does require notification of the MOEE of any deposit of a pesticide into the environment out of the normal course of events (e.g. accident, spill, theft or fire)³⁹⁶ and authorizes the province to require cleanup.³⁹⁷ Part X of the *Environmental Protection Act*, would also provide the opportunity for compensation of the innocent victims of a spill of pollutants generally. This could include pesticide spills during storage or transport.

Waste pesticides are classified as subject waste under Regulation 347, and therefore subject to manifesting requirements for their transport. Manifests for the transport of pesticides other than wastes and warning signs on vehicles are required under the federal *Transportation of Dangerous Goods Act*.³⁹⁸ Commercial facilities which dispose of pesticides through incineration or landfilling are required to obtain certificates of approval under the *Environmental Protection Act*. Currently, the Laidlaw incinerator at Sarnia is the only facility in Ontario authorized to incinerate pesticides. The approval of the MoEE's

District Office is required for the destruction of halogenated pesticides by the facility.³⁹⁹

The MoEE's current Model Sewer Use-By Law recommends the prohibition of the discharge of pesticides into sanitary or combined sewers in any amount.⁴⁰⁰ Bans of this nature have been adopted by several municipalities through their sewer use by-laws.⁴⁰¹

It is important to note that under Ontario law, all wastes, including pesticides, relating to farm operations are exempt from the requirements of Regulation 347.⁴⁰² This is consistent with the general exemptions of "agriculturalists" from the requirements licencing and permit requirements of the *Pesticides Act*, provided that they are "certified" for the purposes of the Act.⁴⁰³

In 1994, the Ministry of Environment and Energy adopted a regulation which exempts depots which collect empty pesticide containers from the waste management site approvals requirements of the *Environmental Protection Act*.⁴⁰⁴ The regulation requires that notice of the establishment of a depot be given to the Ministry,⁴⁰⁵ and sets requirements for controlling access to the site,⁴⁰⁶ staff training,⁴⁰⁷ the storage of containers,⁴⁰⁸ and the keeping of records of the type and quantity of empty pesticide containers accepted.⁴⁰⁹ Empty containers collected at a depot may only be removed by a hauler authorized to do so under Part V of the *Environmental Protection Act*.⁴¹⁰

ii) Federal

Pesticides are regulated by the federal government through the *Pest Control Products Act* (PCPA) and accompanying regulations. Pest control products must be registered under the Act in order to be imported or sold in Canada. As with the Ontario *Pesticides Act*, the PCPA and regulations are silent on the issue of the disposal of waste pesticides.⁴¹¹

The PCPA makes provision for the cancellation of the registration of pesticides if, when based on current available information, the safety of the control product or its merit or value for its intended purpose is no longer acceptable.⁴¹² However, only the registrant (i.e. importer or manufacturer) is barred from using or selling the pesticide under these circumstances.⁴¹³ This means that commercial vendors, applicators and farmers who have stock in hand of pesticides whose registration has been cancelled, may continue to sell or use their existing supplies of the substance.

3) Waste Pesticide Generation and Disposal

i) Commercial Vendors and Applicators

There are no requirements under the *Pesticides Act* and Regulation 914 for pesticide applicators to report the amounts of pesticides which they use. Consequently, no data are available regarding pesticide use by commercial applicators in Ontario.⁴¹⁴ The

only data available regarding the generation of waste pesticides by commercial vendors and applicators come from the MoEE Manifest Database records of waste pesticides shipped-off site for disposal. Data for the period 1992-1995 is presented in **Table VI-1**.

The amounts of waste pesticides being sent to disposal by commercial vendors and applicators appears to be remaining stable, at approximately 1,100 tonnes/yr. The increase in 1994 may reflect the efforts to collect and dispose of outstanding stocks of pesticides identified under the *1994 Canada-Ontario Agreement on the Great Lakes Basin Ecosystem* within the commercial distribution and application sectors. These substances were de-classified under the Ontario *Pesticides Act* in March of that year.⁴¹⁵

Table VI-1: Waste Pesticides Transferred for Disposal in Ontario 1992-1995

Year	Tonnes
1992	1,101.090
1993	818.207
1994	2,036.970
1995	1,173.730

ii) Agricultural Pesticides

Although there are no formal reporting requirements regarding pesticide use by farmers, statistics are available through the Ontario Ministry of Agriculture, Food, Rural Affairs regarding the agricultural use of pesticides in the province. These indicate that the total tonnage of active ingredients of pesticides used in Ontario agriculture has declined over the past decade, from 8,700 tonnes in 1983 to 6,200 tonnes in 1993.⁴¹⁶

However, given the exemptions for agricultural operations from the requirements of Regulation 347, and the absence of any other requirements to report the disposal of pesticides, there is virtually no information available regarding the disposal of de-registered, de-classified, expired, or otherwise waste agricultural pesticides in the province.

This is a serious gap. As of early 1993, 41,000 farmers had been certified in Ontario to apply pesticides to their own farms and those of neighbours.⁴¹⁷ Furthermore, the results of voluntary collection programs conducted in the early 1990's suggest that significant amounts of waste agricultural pesticides exist and are in storage around the province.⁴¹⁸ Furthermore, as noted earlier, the *Pest Control Products Act* permits the continued use of existing stocks of pesticides whose registration has been cancelled under the Act.

It is also important to note that while the available information indicates that the total amounts of active pesticide ingredient used by Ontario farmers is declining, this is a relatively poor measure of the likely environmental and human health effects of pesticide use. Newer pesticides may be more toxic per unit used than older formulations. This may be reflected in the continuing increase in the total economic value pesticides purchased by Ontario farmers each year.⁴¹⁹

In 1995, the most recent year for which data are available, 45 spills involving the agricultural sector were reported to the MoEE, mostly involving pesticides.⁴²⁰

iii) Pesticide Containers

The Crop Protection Institute, (pesticide industry's trade association) states that in 1995, the most recent year for which figures are available, 5,500,180 commercial pesticide containers, up to 23 litres capacity, were shipped in Canada. Of this total 99.2% were plastic, and 0.8% metal.⁴²¹ The CPI's figures indicate that 803,000 containers were shipped in Ontario in 1995.

Pesticide containers pose a number of disposal problems as they are likely contaminated with pesticide residues. The requirement that containers be "decontaminated" (i.e. rinsed with water) may remove most residues. However, no legal requirements exist for the treatment and disposal of the resulting waste water, which is contaminated with the waste pesticides. Industry guidelines recommend placing rinse water in spray tanks for application to the same land that was sprayed with the pesticide.⁴²² There is also a trend towards the use of dissolveable packaging which is placed directly in the spray tank.⁴²³

4) Pesticide Waste Collection Programs

i) Agricultural Pesticides

Despite the absence of regulations dealing with agricultural pesticide disposal, in the past, the Ontario government has made some efforts to encourage farmers to voluntarily bring their empty pesticide containers and their de-registered, outdated, and unusable pesticides to special depots. A province-wide Ontario Waste Agricultural Pesticide Collection Program was conducted by the Ministry of Agriculture and Food in 1991 and 1992 to collect pesticide products with banned or de-registered ingredients, which had become ineffective due to changing pest populations or inappropriate due to changes in crops, or which had become outdated or unusable. Under the program, farmers could turn in their stocks of such pesticides at one of 29 sites for disposal without charge.⁴²⁴

The results of the program provide some indication of the quantities of waste pesticides which may be in storage on farms. 35,000 kg and 55,000 litres of waste pesticides were collected from the 960 farmers who participated in the program. The substances collected included the banned or de-registered pesticides outlined in **Table VI-2**, and other pesticides such as heptachlor, alachlor and 2,4,5,-T.⁴²⁵

The only program established to collect de-registered or waste pesticides since the completion of the Waste Agricultural Pesticide Collection Program in 1992 is a single site pilot project set up by Laidlaw Environmental Services Ltd. in London Ontario in August 1995. The site charges \$1.50/kg for dry formulations, and \$2.75/L for liquids.⁴²⁶ In its first year of operation, the site collected a total of 180 litres of pesticides, primarily lindane and atrazine, and smaller amounts of other older pesticides from three individuals.⁴²⁷

Table VI-2: De-registered Pesticides Collected Through the Ontario Waste Agricultural Pesticide Program

Active Ingredient	Quantity Collected (kg)
Aldrin	153.0
Chlordane	293.3
DDT	1,189.0
Dieldrin	69.1

In April 1997, The Canadian and U.S. federal governments made a commitment to continue to support Great Lakes watershed "clean sweeps" to collect unwanted and hazardous agricultural chemicals for appropriate disposal, as part of a Binational Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes.⁴²⁸ However, as of the fall of 1997, no new programs had been established in Ontario.

ii) Pesticide Containers

A pesticide container recycling program was established by the Crop Protection Institute, a pesticide industry association, in 1992. The program permits the return of clean containers. The Institute states that, as of the end of 1995 nearly 1 million empty containers had been collected and recycled. Plastics are recycled into agricultural products such as fence posts, and metal containers are turned into reinforcement bars for use in construction.

In 1996, over 150 pesticide vendors participated in the collection of empty pesticide containers from farmers and licenced exterminators,⁴²⁹ operating under the "Pesticide Collection Depot" provisions of Regulation 347. The container recovery rate for Ontario in 1995 was stated by the Institute to be 62.5%.⁴³⁰

The option of reusing pesticide containers does not appear to have been pursued. It is also important to note that the reuse or recycling of containers collected at depots is not required by the Regulation.

5) Recent Regulatory and Policy Initiatives

The existing provisions of Regulation 914 require the burying or burning of empty agricultural pesticide containers. In July 1996 the MoEE proposed, through its Responsive Environmental Protection document, amendments to require the recycling of empty pesticide containers.⁴³¹ At the same time, the Ministry proposed to remove some of the "operational and administrative requirements" which apply to pesticide container depots as

defined by Regulation 347. It was also suggested that the types of wastes which these facilities may collect be expanded to include waste pesticides, among other things.⁴³²

The Ministry re-iterated its proposals for regulatory reform in November 1997.⁴³³ In the meantime, the Ministry's pesticide program staff has been reduced by 55%,⁴³⁴ measured against a fiscal 1994/95 base year.

6) Conclusions and Recommendations

The information available regarding the use, generation and disposal of waste pesticides in Ontario is very limited. No data are available regarding the use of pesticides by commercial applicators. The only reliable data available related to the disposal of waste pesticides from vendors and commercial applicators are those reported under the Waste Manifest Database. The amounts reported in this way over the past few years appear to be approximately stable, at 1,100 tonnes per year. Incineration and secure landfilling are the primary fates of waste pesticides shipped off-site for disposal by vendors and commercial applicators.

Recommendations:

VI-1. *Regulation 914 should be amended to require that commercial pesticide applicators file annual reports with the Ministry of Environment regarding the identity (PCPA Registration Number) and quantity pesticides used each year, and the purposes for which the pesticides were applied.*

VI-2. *Regulation 914 should be amended to require that commercial pesticide vendors, including agricultural supply vendors, file annual reports with the Ministry of Environment regarding the quantity and identity of pesticides sold each year.*

As a result of the exemption for agricultural operations from requirements of Regulation 347 and the permitting provisions of the *Pesticides Act*, virtually no information is available on the amounts or fate of waste, expired, banned or de-registered agricultural pesticides. However, the results of provincially sponsored "clean sweep" programs suggest that significant amounts of waste agricultural pesticides, including de-registered substances are in storage in the province.

The last "clean sweep" program was conducted in the province in 1992. A commitment to conduct further programs was made by Canada in the April 1997 *Canada-U.S. Toxics Strategy for the Great Lakes*. However, no action has been taken to implement this commitment to date.

Recommendations:

VI-3. *The Ministries of Agriculture, Food and Rural Affairs, and of the Environment, Environment Canada and Health Canada's Pest Management Regulatory Agency should conduct a "Clean Sweep" program to collect waste, expired or de-registered agricultural pesticides as soon as possible, as per Canada's commitments under the April 1997 Canada-U.S. Binational Virtual Elimination Strategy for Persistent Toxic*

Substances.

VI-4. The general exemptions for the handling and disposal of waste agricultural pesticides from the requirements of Regulation 347 should be removed. Exemptions may be provided for the delivery of waste pesticides to "clean sweep" or subsequent program collection points.

The Ministry of Environment and Energy has also proposed to expand the exemption from the approval requirements of the *Environmental Protection Act* which currently applies to depots for the collection of empty pesticide containers, to include depots which collect waste pesticides.

The goal of facilitating the regular collection of waste pesticides is laudable. However, the approach proposed by the Ministry entails significant risks of contamination or fire, and occupational health and safety issues associated with the storage and handling of waste pesticides, substances which are, by definition, toxic. These concerns are particularly relevant in light of the recent report of the Ontario Fire Marshal regarding a July 1997 fire at a Hamilton plastics recycling facility under a similar "standardized approval" regime to that proposed for waste pesticide collection depots.⁴³⁵

Recommendations:

VI-5. The establishment of waste pesticide collection depots should continue to require a Certificate of Approval under the Environmental Protection Act. The Ministry should move forward with the development of guidelines for the approval and operation of such facilities to expedite their establishment as soon as possible. The following requirements should apply to waste pesticide collection depots:

- specific, enforceable provisions for the training and certification of depot operators and staff should be established, with requirements for regular re-certification. These requirements should emphasize regulatory requirements, fire and spill prevention and response, and occupational health and safety;*
- limits on quantities which may be stored on-site at any given time and requirements regarding storage practices;*
- requirements for planning and the necessary equipment to respond to spills and other emergencies;*
- requirements regarding facilities location, including prohibitions on the location of sites in close proximity to schools, hospitals, corrections facilities, high density residential areas and similar sensitive sites;*
- prior to the issuing of a certificate of approval, the Ministry of Environment should seek and obtain confirmation from the local fire department that the facility is in compliance with fire safety requirements, including appropriate security measures, an approved fire safety plan, floor and site plans, an*

inventory of materials, and personnel adequately trained in the fire safety plan and emergency procedures;

- *depot operators should be required to file monthly reports with the Ministry of Environment regarding the quantities, types and fates of pesticides collected and in storage at the site. These reports should be made available to the public; and*
- *pesticides collected at waste pesticide collection depots should be required to be destroyed at an approved facility.*

VI-6. The specific locations of approved pesticide collection depots and the identities of their owners and operators should be listed in the publicly accessible registry of sites proposed in Recommendation IV-2.

VI-7. The government of Ontario should impose of a 1% waste pesticide handling charge on the sale of all pesticides in the province of Ontario.⁴³⁶ The revenues from this charge should be dedicated to support the operation of waste pesticide collection depots, including the training of staff, handling and disposal costs, educational programs for generators, and research on the generation and disposal of waste pesticides. Certified agriculturalists, as defined by the Pesticides Act, and members of the general public should be permitted to deposit waste pesticides at such facilities free of charge.

The provisions of the federal *Pest Control Products Act* permit the continued sale and use of existing stocks of pesticides whose registration has been cancelled under the Act. This means that pesticides whose registration may have been withdrawn for reasons of environmental or human safety may continue to be sold, used and released into the environment.

VI-8. The Pest Control Products Act should be amended to prohibit the sale, export or use of pesticides whose registration under the Act has been cancelled. A similar provision should be added to the Ontario Pesticides Act for pesticides whose classification under the Act is withdrawn. The cancellation of the registration of such pesticides should be accompanied by a requirement that existing stocks be delivered to waste pesticide collection depots for destruction. The export of de-registered pesticides to jurisdictions where the use of such pesticides is permitted should be specifically prohibited.

More than 800,000 commercial pesticide containers were shipped in Ontario in 1995, the most recent year for which statistics are available. A program has been established by the pesticide industry to collect and recycle empty pesticide containers. The operation of pesticide container collection depots, subject to certain conditions, has been exempted from the approval requirements of Part V of the *Environmental Protection Act*. The current recovery rate is stated by the industry to be 62.5%.

There are currently no requirements that collected containers be recycled or reused. In fact, the existing provisions of regulation 914 require the burial or burning of empty pesticide containers. The Ministry proposed to weaken the existing requirements for pesticide container collection facilities in July 1996. This is of concern given the issues of the adequacy and enforceability of such conditions raised by the July 1997 Plastimet fire and highlighted by the Office of the Fire Marshal in its subsequent report.

Recommendations:

VI-9. Existing requirements for the exemption of pesticide container collection depots from the requirement to obtain a Certificate of Approval should be revised to strengthen the requirements regarding staff training, storage limits, and fire protection. In particular:

- specific provisions for the training and certification of operators and staff should be established, particularly with respect to regulatory requirements, fire prevention and response, and occupational health and safety, with requirements for regular re-certification;*
- limits on the quantities of containers which may be stored on-site at any given time, and requirements regarding storage practices, should be established;*
- a requirement should be established that notice be given to the Ministry of Environment of intent to establish a collection depot prior to the commencement of operations, including the specific location and the identity of the owner and operator. The notice should be posted on the Environmental Bill of Rights Environmental Registry for public comment for a period of not less than 30 days. Operations should not be permitted to commence until the notice of intent is acknowledged by the Ministry. The Ministry should have the option of declining to permit the commencement of operations or of imposing specific additional conditions on individual facilities;*
- the Ministry should not acknowledge a notice of intent unless it includes a confirmation from the local fire department that the facility is in compliance with fire safety requirements; and*
- pesticide container collection depot operators should be required to file quarterly reports with the Ministry of Environment and Energy regarding the quantities, types and fates of containers collected and the types of pesticides that they contained. These reports should be made available to the public, along with an annual summary report on depot operations across the province.*

VI-10. The specific locations of pesticide container collection facilities and the identities of

their owners and operators should be provided in the public registry of sites proposed in Recommendation IV-2.

- VI-11. Regulation 914 should be amended to require the reuse or recycling of empty pesticide containers. Consideration should be give to the establishment of a deposit-refund requirements on pesticide containers to ensure their return to vendors.*

VII.

BIOMEDICAL WASTES

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1) Introduction

The category of "biomedical wastes" covers a range of materials from hospitals, medical and research laboratories, veterinary clinics, doctors' and dentists' offices, funeral homes and long term care facilities. It includes instruments (e.g. scalpels and syringes), laboratory wastes, blood and blood contaminated materials, animal carcasses, pharmaceuticals, and human body parts.

The disposal of these wastes presents a number of serious problems. These include the potential for the exposure of workers or the public to pathogens, or waste pharmaceuticals.

Biomedical wastes are generally estimated to constitute less than 10% of the total wastes generated by health care facilities in Ontario.⁴³⁷ Furthermore, it was estimated in 1992 that only 60% of the wastes disposed of as biomedical waste by health care facilities actually required special handling.⁴³⁸ The remainder consisted of ordinary municipal solid wastes from cafeterias, administrative offices, and general building maintenance.

2) Regulatory Framework

Biomedical wastes are classified as hazardous wastes under Ontario Regulation 347. In particular, "pathological waste" is defined as follows:

- "i) any part of the human body, including tissues and bodily fluids, but excluding fluids, extracted teeth, hair, nailclippings, and the like, that are not infectious,
- ii) any part of the carcass of an animal infected with a communicable disease or suspected by a licensed veterinary practitioner to be infected with a communicable disease, or
- iii) non-anatomical waste infected with a communicable disease."

As such, biomedical wastes are subject to the generator registration and manifesting requirements of the regulation. However, nursing homes, rest homes, and professional dental and medical offices are exempt from the generation registration requirements.⁴³⁹

Any biomedical waste disposal site would require a certificate of approval under the *Environmental Protection Act* and, if involving incineration or landfilling, be subject to a mandatory public hearing under the Act.⁴⁴⁰ There are currently no approved biomedical waste disposal facilities in Ontario.

There is one notable exception to this requirement for disposal site approvals. Hospital incinerators operational before December 31, 1985 are exempted from Part V of the *Environmental Protection Act*. This permits them to accept off-site wastes from other hospitals for incineration, in addition to waste generated on site without an approval from the Ministry.

As with other forms of hazardous wastes, interprovincial and international movements of biomedical wastes are regulated under the federal *Transportation of Dangerous Goods Act*, and the *Canadian Environmental Protection Act (CEPA)*. For the purposes of the *CEPA Export and Import of Hazardous Waste Regulations*, biomedical wastes are defined as per the 1992 CCME Guidelines for the Management of Hazardous Wastes In Canada, plus infectious wastes as defined by the *Transportation of Dangerous Goods Regulations*.⁴⁴¹ Canadian exporters of biomedical wastes must obtain prior consent from the receiving country (or province), through Environment Canada, before exporting wastes.

3) Biomedical Waste Generation and Composition

A detailed study on the generation of biomedical wastes in Ontario was completed by Ortech International in December 1992.⁴⁴² It estimated that 14,556 tonnes of waste were disposed of as "biomedical waste" as defined by Regulation 347 each year in Ontario. The waste stream composition described in that report is outlined in **Table VII-1**.

The definition of biomedical waste used in this study was that proposed by the MoEE in May 1992, based on the February 1992 CCME definition.

The 1992 ORTECH study indicated that Hospitals accounted for the generation of approximately 67% of the biomedical waste in the province.⁴⁴³ An earlier (1991) Ministry of Environment study suggested that hospitals accounted for 60%, veterinary clinics 14%, medical and research laboratories 13%, doctors' offices 7%, dentists' offices 3%, funeral homes 2% and special homes 1%.⁴⁴⁴

It is also important to note that some elements of the biomedical waste stream are not captured in the above figures. The ORTECH study noted, for example, that several sites, such as funeral homes, veterinarians' and coroners' offices and some hospitals reported managing blood disposal by draining it directly to the sewers.⁴⁴⁵ There were also reports of sewerage of pharmaceutical wastes.⁴⁴⁶ The sewerage of whole blood would contradict the Ministry's Model Sewer Use-By Law,⁴⁴⁷ although it may be permitted by individual municipalities. The sewerage of pharmaceutical wastes is not directly addressed by the current Model Sewer Use-By Law.

Table VII-1: Ontario Biomedical Waste Stream Composition (1991)

Waste Category	Tonnes/yr	% of Total
Biomedical:		
Human Anatomical Waste:	184	
Animal Wastes:	30	
Microbiological Waste:	1,717	
Liquid Blood Waste:	1,388	
Blood Contaminated Biomedical Waste:	981	
Other Body Fluids Waste:	381	
Sharps:	1,966	45.5%
Total:	6,650	
Animal Carcasses	1,530	10.5%
Pharmaceuticals	265	2.0%
Continuous: Blood Contaminated (wastes contaminated with blood but not to the degree of being considered biomedical wastes)	421	3.0%
Non-Biomedical	5,690	39.0%
Total	14,556	100%

The available data appear to indicate a downward trend in the amounts of wastes disposed of as "biomedical waste" over the past few years. Totals for the amounts of biomedical wastes shipped off-site for disposal for 1992 to 1995 derived from the Ministry of Environment's Waste Manifest Database are shown in **Table VII-2**.

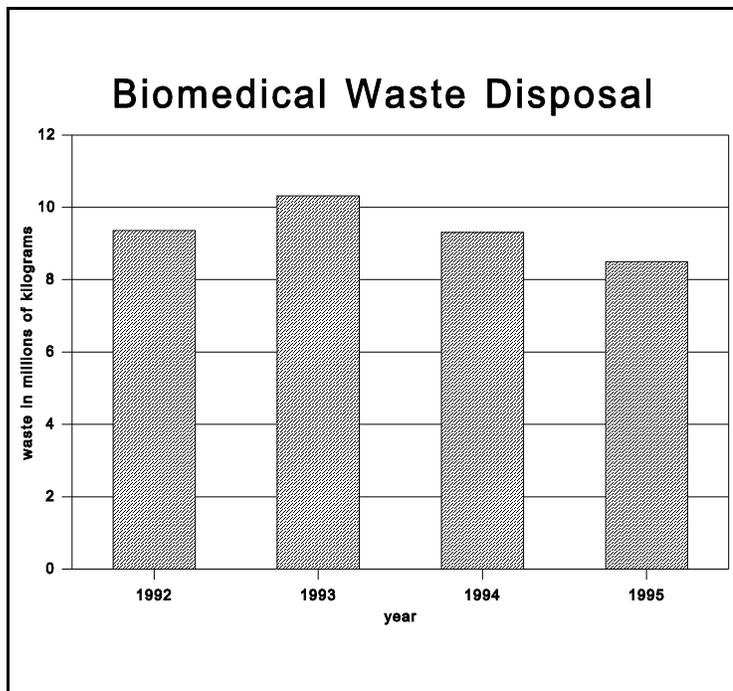
The Ortech study estimated that 14,556 tonnes of waste were disposed of as biomedical waste each year in the late 1980's and early 1990's. The estimated total for 1995, the most recent year for which data is available, combining on and off-site disposal, is 11,574 tonnes.⁴⁴⁸

The reduction in the amounts of waste being disposed of as biomedical waste appears to be principally a result of efforts by hospitals to separate wastes which require handling

Table VII-2: Biomedical Wastes Shipped Off-Site for Disposal in Ontario 1992-95

Year	Biomedical Waste Total (kg)
1992	9,360,567
1993	10,316,765
1994	9,309,595
1995	8,500,528

as biomedical wastes, from those which do not. This direction may have been reinforced by the promulgation of regulations under the *Waste Management Act, 1992*, requiring that hospitals, as defined under the *Public Hospitals Act*, along with other significant industrial, commercial and institutional (IC&I) waste generators, conduct waste audits and develop waste reduction workplans.⁴⁴⁹ The implementation of source separation programs for specified recyclable materials was also required.⁴⁵⁰



The Ministry's efforts, since 1992, to promote the use of a more specific definition of biomedical waste have been a factor as well.⁴⁵¹ However, The generation of biomedical wastes could be expected to increase as the population of the province grows, and its age profile rises.

4) Disposal/Fate

No commercial biomedical waste incinerators exist in Ontario.⁴⁵² In its 1992 Status Report on Ontario's Air, Water and Waste, the Ministry of Environment and Energy estimated that 60% of Ontario's biomedical wastes are exported for disposal.⁴⁵³ The principle destinations were identified as an incinerator in Gatineau, Quebec, or an incinerator in Ohio.⁴⁵⁴ In the past serious concerns have been raised regarding the operation of out of province biomedical waste disposal facilities, particularly in relation to emissions, incomplete incineration of wastes, leaking trucks and the presence of vermin.⁴⁵⁵

In 1991 charges were laid by the Ontario and Quebec Ministries of the Environment against DECOM Group, the major biomedical waste hauler in Ontario and operator of the Gatineau incinerator. The DECOM Group was subsequently purchased by Laidlaw Waste Systems, which emerged as the major biomedical waste hauler in the province.⁴⁵⁶ Laidlaw's medical waste business was purchased by Med-Tech Environmental Ltd., of Brampton, Ontario in April 1997.⁴⁵⁷ Med-Tech is also reported to have bought out a number of the remaining small haulers in the province.⁴⁵⁸

Med-Tech has recently shut down the incinerator in Gatineau, which it acquired as a result of its purchase of Laidlaw's biomedical waste business, and is reported to be seeking to purchase one in Vermont, currently operated by Safety Medical Systems Incinerator Inc. Med-Tech is reported to autoclave most of the wastes which it hauls to its Brampton

facility. The residues are disposed of in the Britannia Road sanitary landfill. Although apparently still falling within the existing Regulation 347 definition of "pathological wastes" these shipments of "treated" wastes are not manifested. Anatomical wastes and cytotoxic drugs are disposed of at the Vermont facility, as are other biomedical wastes when requested by the generator.⁴⁵⁹

The remaining 40% of the biomedical waste generated in Ontario is disposed of in local hospital incinerators around the province.⁴⁶⁰ In 1995, the most recent year for which figures are available, this amounted to 3,074 tonnes of waste.⁴⁶¹

Ministry of Environment and Energy staff have raised serious concerns regarding the disposal of wastes in hospital incinerators noting that the "exemption awards significant cost benefits to the regulated community (hospitals and Ministry of Health) while having an overall negative impact on the environment."⁴⁶² With the exception of the Royal Victoria Hospital in London, Ontario these facilities operate without air pollution control systems.⁴⁶³ Particular concerns have been raised regarding emissions of heavy metals, hydrogen chloride, and dioxins and furans from hospital incinerators.⁴⁶⁴ Incinerator ash must also be treated as a hazardous waste, due to the presence of heavy metals and other contaminants.

Hospital incinerators operational before December 31, 1985 are exempted from Part V of the *Environmental Protection Act*, permitting them to accept off-site wastes from other hospitals for incineration, in addition to waste generated on site. The largest recipient of off-site waste has been the Toronto Western Hospital,⁴⁶⁵ which disposed of 435 tonnes of biomedical waste from off-site sources in 1995.⁴⁶⁶ However, this facility's incinerator was closed in April 1997.⁴⁶⁷

Over the past year, a significant number of existing hospital incinerators have closed, and it is reported that only 74 of the 106 facilities⁴⁶⁸ which were in operation in 1995 are still functioning. This has been a result of the hospital restructuring process taking place in the province, and the availability of less expensive off-site disposal options.⁴⁶⁹

5) Recent Regulatory and Policy Initiatives

i) Biomedical Waste Definition and Regulation

The Ministry of Environment and Energy proposed new a definition of "biomedical waste" in 1992. This is to distinguish between the portion of the waste stream which requires special management, and the portion that can be appropriately managed as municipal solid waste.

The most recently available draft of the definition defines "biomedical waste" as waste generated by a wide range of facilities, including health care and residential facilities, animal care facilities, medical and veterinary research and teaching establishment, laboratories, needle exchange programs, professional offices of health professionals, mortuaries, and funeral establishments, vaccine production and testing facilities, and

mobile health care facilities. The definition includes human and animal anatomical and non-anatomical wastes, other wastes which come into contact with a human or animal potentially infected with one of a specified list of agents or cytotoxic (drug) waste. Wastes generated in food production, general building maintenance, or administration of the facilities listed in the definition are explicitly excluded from the definition.

The draft regulation would require the incineration of human anatomical waste, waste potentially infected with specific agents, and cytotoxic wastes. In addition, all other biomedical waste would be required to be converted to "treated biomedical waste." Autoclaving would be required for wastes which are human, animal or microbiological cultures and stocks and cultures and stocks of human or animal cell lines to produce at least a 99.9999% reduction in spores of *bacillus stearothermophilus*. Autoclaving or chemical or thermal treatments to produce at least a 99.99% reduction in spores of *bacillus stearothermophilus* would be required for other biomedical wastes.

On-site treatment of biomedical waste would be exempted from the waste management site approval requirements of the *Environmental Protection Act*. The regulation would also establish labelling and packaging requirements for the transport of treated biomedical waste from the site where it is treated to a disposal site. Apparently manifesting would not be required.

The draft regulation also includes a number of important exemptions. The direct discharge of blood into sewage systems would be permitted. This is despite the fact that this would be in contradiction to the Ministry's own current Model Sewer-Use By-Law.⁴⁷⁰

Exemptions for wastes from vets, health professionals, mortuaries and funeral establishments, mobile health care, nursing homes, independent health facilities, from generator registration and manifesting requirements of Regulation 347 are also provided. In addition, animal wastes which have been screened and determined not to be infected with a specified list of agents, is to be excluded from definition of biomedical waste. A small generator exemption (<5kg) is provided as well.

ii) New Biomedical Waste Disposal Facilities

A proposal for the establishment of new regional facilities for disposal of biomedical waste was also released by the Ministry in 1992.⁴⁷¹ However, no further action has been taken to taken to date on these initiatives.

iv) CEPA Biomedical Waste Management Regulation

In 1993, a proposal was made by Environment Canada for a Biomedical Waste Management Regulation under CEPA, which would apply to all federal facilities. However, no such regulation has been made under the Act to date.

6) Developments in Other Jurisdictions

Under the 1990 amendments to the *Clean Air Act*, the United States Environmental Protection Agency is required to develop new emission standards for medical waste incinerators on the basis of the Maximum Achievable Control Technology (MACT). A commitment to the development and implementation of these regulations was re-iterated by the U.S. government in the April 1997 *Canada-U.S. Toxic Strategy for the Great Lakes*.⁴⁷² Canada made no similar commitment. The USEPA published its final rule for biomedical waste incinerators in August 1997.⁴⁷³

7) Conclusions and Recommendations

The management of biomedical wastes in the province has undergone a number of significant changes over the past few years. There is evidence of a general downward trend in the amounts of wastes being treated as disposed of as biomedical waste. This appears to be the result of a more precise application of the definition of these wastes, and of the impact of the province's municipal solid waste 3Rs regulations promulgated in 1994. However, biomedical waste generation may begin to rise again as opportunities for diversion of non-biomedical wastes are exhausted, and the province's population continues to grow and its age profile rises.

The Ministry of Environment and Energy has proposed a new, more specific, definition of biomedical wastes, and the specification of treatment requirements. However, the Ministry's proposals contain a number of significant exemptions. In particular, the discharge of blood into sewer systems would be permitted, and exemptions would be provided to a range of smaller facilities from the waste generator and manifesting requirements of Regulation 347. Exemptions for small quantity generators would also be provided. Furthermore, the disposal of "treated biomedical wastes" in sanitary landfills would be permitted.

Recommendations:

- VII-1. The province should proceed with the adoption of a new definition of "biomedical waste" and the specification of treatment requirements in Regulation 347.*
- VII-2. The proposed definition of "biomedical waste" should be expanded to include other wastes which come into contact with a human or animal potentially infected with one of a specified list of agents, other potentially infectious or pathogenic agents, or cytotoxic (drug) waste.*
- VII-3. The province should document and make available to the public its scientific and technological justifications, from the perspectives of environmental protection and public health and safety for its proposals for permitting the:*
 - sewerage of waste whole blood; and*

- *the disposal of "treated biomedical wastes" in sanitary landfills*

no later than the time that the proposed new definition of biomedical wastes is posted on the EBR registry for public comment as a proposed amendment to Regulation 347.

- VII-4. Veterinarians, health professionals, mortuaries and funeral establishments, mobile health care, nursing homes, and independent health facilities should be required to provide quarterly reports on the quantities, composition and fate of "biomedical wastes" generated at their facilities under the new "biomedical waste" provisions of Regulation 347. Small quantity generators should be required to file annual reports.*

In the meantime, the Ministry is permitting the operation of a biomedical waste treatment facility and the disposal of "treated biomedical wastes" from this facility "as if" the new biomedical waste definition were in place under Regulation 347. There appears to be no statutory basis for this arrangement, as the category of "treated biomedical waste" does not exist within the wording of Regulation 347. Consequently, the disposal of such wastes should be subject to generator registration and manifesting requirements and "pathological wastes."

Recommendation:

- VII-5. "Treated biomedical waste" should remain subject to the existing waste generator and manifesting requirements, and disposal site approval requirements, for "pathological wastes" under Regulation 347 until such time as a new definition of "biomedical waste" is incorporated into the regulation.*

The number of hospital incinerators in operation throughout the province has declined significantly over the past year. However, the disposal of wastes in such facilities which, with one exception, lack any air pollution control equipment, remains a serious problem. No progress has been made either on the establishment of emission controls on these facilities, or the establishment of new facilities. Maximum Achievable Control Technology (MACT) based standards for medical waste incinerators were adopted in the United States in August 1997.

Recommendation:

- VII-6. The Ministry of Environment and Energy should move towards the adoption of a regulation to control emissions from facilities incinerating biomedical wastes, including hospitals, as soon as possible.*

The province remains dependent on export for the final disposal of biomedical wastes which require incineration. With the closure of the Gatineau incinerator, these exports are now entirely directed towards the United States. This leaves the province

vulnerable to the possibility that the Canada-U.S. border might be closed to such exports at some point in the future. Concerns have also been raised in the past regarding the safety of facilities to which biomedical wastes have been exported to for disposal from Ontario.

Recommendation:

VII-7. The province should continue to seek the development of facilities within Ontario for the handling of Ontario biomedical wastes requiring incineration.

VIII. WASTE OIL ¹

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¹.The chapter is based on research completed by Geoff Ruby, LL.B., M.E.S.

1) Introduction

Approximately 1 billion litres of lubricating oils are sold annually in Canada.⁴⁷⁴ It is estimated that 50% of these oils are consumed and/or lost in use. This potentially leaves 500 million litres of waste oil which must be disposed of each year.⁴⁷⁵ It has been suggested that 30 million litres of waste oil is disposed of improperly by the do-it-yourself automotive sector in Ontario alone. This is roughly equivalent to a spill of Exxon Valdez proportions every year, without even taking into account oil entering the environment from other sources.⁴⁷⁶

2) Regulatory Framework

i) Federal

Used crankcase oil was one of 44 substances placed on the original Priority Substances List (PSL) of substances to be assessed for their "toxicity" under the *Canadian Environmental Protection Act* (CEPA) in 1989. The assessment, completed by Environment Canada and Health Canada in 1994 identified a wide range of environmental problems associated with generation and disposal of used oil. However, the assessment concluded that there was insufficient specific information regarding the impacts of used crankcase oil on the environment to determine whether or not it could be considered "toxic" as defined under the CEPA.⁴⁷⁷ In the absence of a determination of "toxicity," the federal government has no authority under CEPA to regulate a substance.

The *Fisheries Act* prohibits the discharge of substances likely to be harmful to fish to waters frequented by fish, unless the discharges are authorized by regulation.⁴⁷⁸ Waste oil may be considered a deleterious substance for the purposes of the Act.⁴⁷⁹

Interprovincial and international movements of waste oil may be subject to the manifesting requirements of the *Transportation of Dangerous Goods Act*, depending upon the level of contaminants present in the oil.⁴⁸⁰

ii) Provincial

Waste oil is usually considered by the Ministry of Environment and Energy to be a "liquid industrial waste" and therefore subject to the waste approval requirements of the *Environmental Protection Act* and the generator registration and waste manifesting requirements of Regulation 347. Waste oil contaminated with specific substances identified in the regulation as hazardous waste is also considered to be subject waste for the purposes of the regulation.

However, there are a number of significant exemptions to these requirements. The definition of 'subject' waste in Regulation 347 exempts wastes from service stations under certain conditions.⁴⁸¹ Waste oils generated by a do-it-yourselfer (DIY) may also be exempt from these requirements by virtue of being a "domestic" waste.⁴⁸² Waste oil generated by

commercial or industrial sources is exempt if produced or otherwise accumulated in a quantity of less than 25 litres.⁴⁸³

Section 3(1)(7) of Reg. 347 may provide an exemption from Part V of the Act and the regulation for waste oils sent directly from a generator to an oil reprocessing facility as a result of its general exemption of certain types of recycling activities.

The burning of waste oil as "waste derived fuel" on the site of its generation does not require a Certificate of Approval provided that not more than ten tonnes is burned per day⁴⁸⁴ and it has a quality of fuel "not worse than commercially available low grade fuel." It must also not contain more than prescribed concentrations of heavy metals, PCB's and total halogens.⁴⁸⁵ Sites in operation before September 1992 are also exempted from the requirement to obtain a Certificate of Approval.⁴⁸⁶

In September 1992 Regulation 347 was amended to permit retailers to establish depots to take back used crankcase and gear oil, transmission and hydraulic fluid, oil filters and anti-freeze without, subject to certain conditions, obtaining a Certificate of Approval.⁴⁸⁷ It was intended that a regulation making participation in the program by retailers mandatory would be promulgated within 18 months of the coming into force of the used oil depot regulation. However, to date, this has not happened. Approximately 350 depots are reported to be currently operating in Ontario under the used oil depot provisions of Regulation 347.⁴⁸⁸ It was anticipated that under the original program, more than 2,000 depots would have been established.

The provisions allow depots to be set up at a location of a business or automotive service station, solely for the collection and storage of selected wastes of products it regularly sells.⁴⁸⁹ Manifests are not required for the removal of stored wastes, and DIY oil changes are explicitly exempted from generator registration and manifesting requirements when storing used oil at home or transporting it to a waste depot.⁴⁹⁰

Local fire officials are required to be notified regarding the opening and operation of a waste depot.⁴⁹¹ Requirements for the control of site access, the training of staff,⁴⁹² storage, spill containment and the presence of fire fighting equipment⁴⁹³ are also established. Depots are limited to collecting wastes of products regularly sold at the business, in quantities of not more than 5 oil filters, or 25 litres of waste lubricant or of anti-freeze, per person per day.⁴⁹⁴

Records are required to be kept of the source, type and quantity of waste collected.⁴⁹⁵ Select wastes are required to be removed only by the party to whom a Certificate of Approval has been issued authorizing its removal.⁴⁹⁶ Provisions are also made for site closure.⁴⁹⁷ Regulations made under the *Gasoline Handling Act*, and the *Fire Marshals Act* prevail over those of Regulation 347 with respect to select oil waste depots in the event of a conflict.⁴⁹⁸ However, it is important to note that there are no requirements for the filing of regular reports with the Ministry regarding waste depot operations, or that the wastes collected actually be recycled.

The use of waste oil for dust suppression in Ontario was banned in 1988, principally due to concerns over PCB contamination of oil.⁴⁹⁹

Marinas are required to provide containers for litter, which is defined to include fuels and lubricants, through the Marinas Regulation made under the *Environmental Protection Act*.⁵⁰⁰

The prohibition of the disposal of fuels, and used oil and grease into municipal storm sewer systems is recommended under the Ministry of Environment and Energy's Model Sewer-Use By-Law.⁵⁰¹ However, the Model By-Law does not prohibit discharges of oil into sanitary sewer systems.

2) Waste Oil Generation and Fate

i) Waste Oil Generation

Estimates of the amount of lubricants sold in Ontario each year range from 389⁵⁰² to 500 million litres.⁵⁰³ Approximately half of these lubricants are believed to be lost in use, leaving up to 250 million litres⁵⁰⁴ requiring disposal. Estimates of the amounts sold to the automotive sector, including commercial vehicles range from 25%⁵⁰⁵-40%⁵⁰⁶ of total sales. The remainder includes sales for other forms of transport, such as aircraft, trains and ships, and industrial uses. It is estimated that between 30⁵⁰⁷ and 41 million⁵⁰⁸ litres are sold to the do-it-yourself/rural and farm markets each year.

In addition to the generation of used oil, an estimated 13 million oil filters are discarded in Ontario each year. The landfilling of these filters has been estimated to result in the annual deposit of 4.6 million litres of oil in landfills.⁵⁰⁹ The disposal of 130 million empty 1 litre oil containers in Canada each year has been calculated to result in the deposit of 5 million litres of oil into landfills.⁵¹⁰

ii) Waste Oil Fate

Safety-Kleen Canada, the major re-refiner of lubricating oils in the province, estimates that of the 250 million litres of waste oil generated in Ontario in 1996, 27% is re-refined, 15% is burned in cement kilns, 21% is exported, typically for incineration, 7% is burned in small furnaces, and 30% (75 million litres) is unaccounted for.⁵¹¹ It has been reported that approximately 30 million litres of oil are "dumped/lost" through the DIY market alone annually.⁵¹² Safety-Kleen's estimates, presented in **Table VIII-1** suggest that the portion of waste oil being re-refined is declining, while the totals exported or burned as waste-derived fuel are rising.

Table VIII-1: Fate of Waste Oil in Ontario 1995 & 1996⁵¹³

Fate	1995		1996	
	Amount (litres)	Per Cent of Total	Amount (litres)	Per Cent of Total
Re-refined	87,500,000	35%	67,980,000	27%
WDF & Greenhouses	10,000,000	4%	17,995,000	7%

Exports (Incineration)	40,000,000	16%	51,525,000	21%
Cement Kiln Fuels	37,500,000	15%	37,500,000	15%
Unaccounted For	75,000,000	30%	75,000,000	30%
TOTAL	250,000,000	100%	250,000,000	100%

iii) Environmental Impacts of Waste Oil

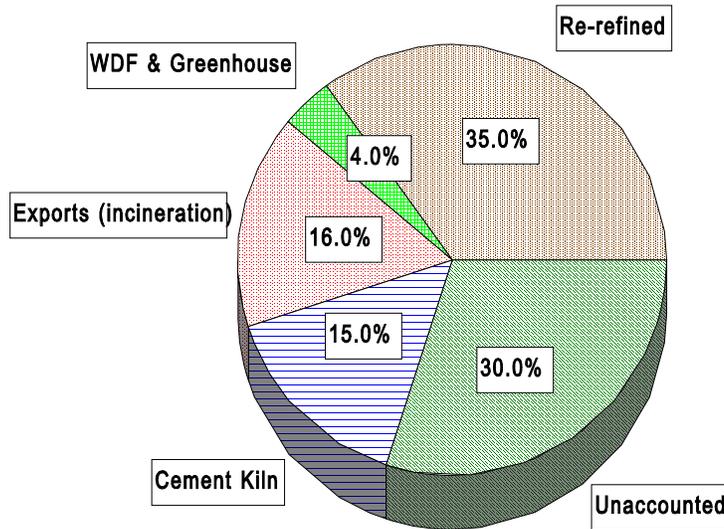
The figures provided by Safety-Kleen suggest that as much as 75 million litres of waste oil enter Ontario's environment each year. This is roughly equivalent to two and a half Exxon Valdez sized spills.

The impacts on the environment of waste oil may differ depending on which media the oil is released into. Waste oil disposed of in landfills or on land may contaminate that land, runoff to surface waters, or leach into groundwater. However, it has been suggested that most waste oil deposited in landfills may be absorbed by other wastes, limiting its migration into other media.⁵¹⁴ This theory does not appear to have been formally investigated.

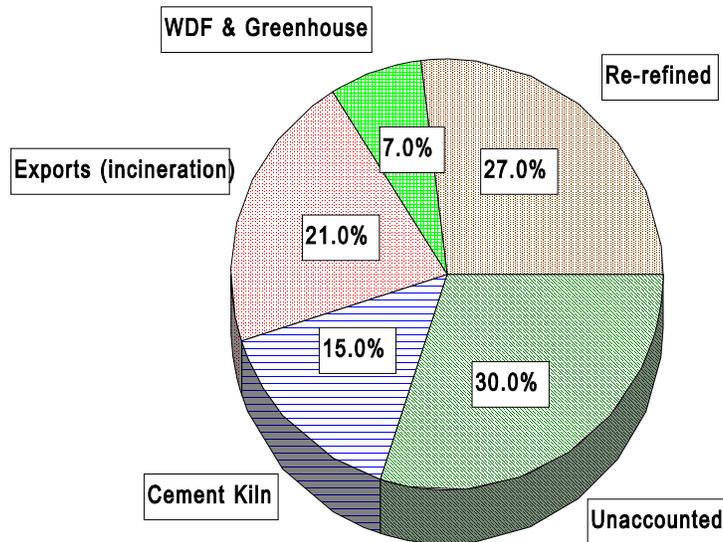
One litre of waste oil can contaminated up to one million litres of water.⁵¹⁵ Disposal in storm sewers or directly into watercourses may create oil sheens having negative effects on biota.⁵¹⁶ Disposal into sanitary sewers can interfere with the operation of sewage treatment plants. These may be impaired by as little as 50 parts per million in oil in water.⁵¹⁷

In addition, oil can be contaminated by chemical additives used to enhance engine performance, as a result of physical and/or chemical changes during use, and from mixing with other liquids during disposal.⁵¹⁸ Possible contaminants include trace metals such as lead, cadmium, and barium, as well as polynuclear aromatic hydrocarbons (PAH's), trichlorethylene, benzene, toluene, xylene, glycol, and PCB's.⁵¹⁹ These pollutants may add to the contamination of surface and ground water, and sewage sludge, when waste oil is deposited into these media or into sanitary sewers.

Fate of Waste Oil in Ontario (1995)



Fate of Waste Oil in Ontario (1996)



Some of these contaminants may be released into the atmosphere when waste oils are burned. Burning waste oil may also result in the release of sulphur and nitrogen oxides, which contribute to acidic precipitation and smog. Furthermore, the ash produced in waste oil burners may contain metals and other contaminants.⁵²⁰ The burning of waste oil as fuel reduces the availability of feedstocks for recycling as well.

In 1996 the Ministry of Environment and Energy found that 87% of 660 small waste oil burning furnaces in the province were not in compliance with Ministry requirements regarding air emissions.⁵²¹ These types of furnaces, burning waste oil for space heating had proliferated around the province in the early 1990's.⁵²² Reflecting the concerns about air pollution arising from waste oil burners, in May 1997 the Metropolitan Toronto Council adopted a report from its Commissioner of Works recommending that the Ministry of Environment and Energy cease issuing Certificates of Approval for new waste oil burners in urban areas. The report also recommended that the Ministry revoke the Certificates for existing burners located in areas where alternative waste oil recycling facilities are available.⁵²³

Most of the waste oil generated in Ontario could be effectively recycled (re-refined or reprocessed) into oils and lubricants, asphalt extender and waste derived fuels. The Safety-Kleen plant in Breslau, Ontario, has a capacity to re-refine 191 million litres of oil per year.⁵²⁴ In 1995, however, it only re-refined 87.5 million litres of oil. Half of this came from Ontario sources. The remainder was imported from other provinces and the United States.⁵²⁵

The reprocessing or re-refining of used oil may also have significant environmental impacts. Reprocessing may produce liquid effluent or sludges containing the contaminants originally found in the used oil. Significant air emissions and major odour problems may occur as well, depending on the technology used.⁵²⁶

In addition, there have been major incidents involving the illegal disposal of waste oil in Ontario under the guise of recycling / reprocessing operations. Charges were laid by the Ministry of the Environment on the basis of allegations of such activities on the Toronto waterfront in July 1997.⁵²⁷ There have also been incidents of plants accepting oil for re-refining with levels of contamination higher than those which they are authorized to accept in their Certificates of Approval.⁵²⁸

Case Study: Aquatech Blue

"A year-long environment ministry probe into an oil recycling plant has resulted in 34 charges against the company, its owners and two former managers stemming from alleged dumping of toxic waste in Toronto Harbor.

Aquatech Blue Ltd. on Cherry St. and four company officials were charged under the provincial Water Resources Act and Environmental Protection Act."....."The environmental charges include illegally dumping oil industrial waste into sewers connected to the Keating Channel, the narrow waterway linking the mouth of the Don River with the harbor; and discharging flammable chemical waste to sanitary sewers leading to a Metro Toronto waste treatment plant.

Other charges include passing misinfor-mation to the environment ministry officials during inspections and falsifying company records."

The Toronto Star, August 25, 1997

3) Recent Policy Initiatives

i) Waste Oil Collection Depots

In September 1992 the Ministry of Environment launched, in conjunction with petroleum products industry, a significant initiative intended to facilitate the collection of used oil from DIY, farm and rural sources. As described earlier, Regulation 347 was amended to permit retailers to operate waste depots for the collection of used oil, oil filters, transmission and hydraulic fluids and anti-freeze without needing to obtain a Certificate of Approval, provided that certain conditions were met.

It was originally intended that a regulation to make participation in the program by retailers mandatory would come into force within 18 months of the program's establishment. However, as of December 1997, participation in the program remained voluntary. It was expected that every community in Ontario with a population of over 5,000 would have a collection depot, and that 2,000 depots would be established in the first year of the program.⁵²⁹ In practice, only 350 depots were established,⁵³⁰ and the number of operating depots is reported to be decreasing.⁵³¹

The failure to make the program mandatory, despite the apparent support of the petroleum products industry, appears to have been due to a number of factors. First, there were problems reaching agreement on a funding arrangement for the program. The grocery products distributors, who account for just 0.3% of the automotive oil sales in the province are reported to have been a major stumbling block on this question.⁵³² The issue of who would assume liability for contaminated (particularly by PCB's) waste oil also remains unresolved.

In addition, there were concerns about the proliferation of poorly regulated small furnaces burning waste oil damaging the credibility of the program, and reducing the available feedstocks.⁵³³ It is reported that there was agreement by most of the stakeholders that any business location selling more than 500 litres of oil per year would be required to establish a collection depot. Locations selling less than 500 litres/yr would be required to contract with another depot within a specified distance which would accept the waste.⁵³⁴

ii) Responsive Environmental Protection

In July 1996, the Ontario Ministry of Environment and Energy released proposals for wide ranging revisions to the regulations which it administers.⁵³⁵ The Ministry's proposals included a series of measures which would affect the handling of waste oil.

The Ministry proposed that waste oils sent for re-refining be exempted from existing requirements of the *Environmental Protection Act* and Regulation 347 for subject waste approvals and transportation and handling requirements.⁵³⁶ The Ministry also proposed that "liquid industrial waste" be removed from the existing definition of "subject wastes."⁵³⁷ This would remove waste oils, except possibly those heavily contaminated with substances otherwise classified as hazardous waste, from the waste generator registration and manifesting requirements of Regulation 347.

In addition, the Ministry proposed that "manufacturer controlled networks," within which product manufacturers take responsibility for collection and managing wastes generated from products that they produce, be exempted from the "administrative and approvals requirements" normally required to ship these wastes.⁵³⁸ Presumably this would include networks set up to deal with waste oil.

The Ministry also proposed to remove some of the existing requirements which currently apply to selected waste depots, including waste oil depots set up under the 1992 amendments to Regulation 347, on the basis that they were "excessive relative to the limited environmental risk posed by these sites." It was further claimed that these requirements were a disincentive to retailer participation in programs of this type.⁵³⁹ A roster system of quarterly, semi-annual or annual reports was proposed for "small" volume (<500 kg) hazardous waste shipments.⁵⁴⁰ Finally, a more specific definition of "waste derived fuel" was presented.⁵⁴¹

In addition to these amendments to Regulation 347, Responsive Environmental Protection included proposals to expand the spill reporting exemption for minor spills involving, among other things, fuel or oil spills at fuel outlets.⁵⁴² The replacement of the Marinas Regulation with a voluntary code of practice was proposed as well.⁵⁴³

The Ministry re-iterated its intention to proceed with these changes in November 1997.⁵⁴⁴

4) Recent Developments in Other Jurisdictions

In contrast with Ontario's complete reliance on voluntary measures by industry to deal with waste oil, most other provinces have moved to establish vendor take-back requirements for used oil, oil containers and oil filters.

i) Manitoba, Saskatchewan and Alberta

In conjunction with the Canadian Petroleum Products Institute's Western Canadian Used Oil/Containers/Filters Task Force, the governments of Manitoba, Saskatchewan and Alberta are establishing used oil and oil container stewardship programs. The three governments collaborated to ensure that the programs in each province were, operationally, virtually identical. Manitoba and Saskatchewan have developed stewardship regulations for their programs. Alberta is currently in the process of developing its regulation.

Manitoba's proposed *Used Oil, Oil Filters and Containers Stewardship Regulation* will place new requirements on any person in the business of selling lubricating oil and lubricant filters. Any person supplying lubricating products (or the person who supplies the product to that person) will need to operate, or subscribe to, an approved stewardship program. Stewardship programs will require approval from a Used Oil Management Committee. Oil products and materials will need to be managed appropriately and in accordance with any written guidelines established by the Minister. Liability for problems such as the contamination of collected materials will rest with the person in the care,

custody and control of the oil products. Depot operators, carriers and receivers are obliged to follow all designated procedures and comply with all standards as liability will rest with them.

The regulation will eventually create a province-wide collection system that will operate on a permanent basis and will expand over time by revenue generated from increasing oil and filter demand. The system is financed through a fee incorporated into the price of the product.

Saskatchewan's recovery program for used oil, oil containers and filters was unveiled in 1996.⁵⁴⁵ It is estimated that only 12 million of the 37 million litres of oil generated in the province each year is currently being collected. Under the program, the first seller (most likely the wholesaler or manufacturer) will be required to establish permanent collection depots in most areas of the province. Each seller's plan must be submitted to the Minister of Environment for approval.

The program is financed through a stewardship levy applied separately from the product's price at the point of purchase. Returned oil will be processed and upgraded. Under the regulations, sellers of oil or filters will have to file annual compliance reports with the Ministry. Prohibitions are to be placed on the following uses of waste oil: spreading on roads; placing in landfills; pouring in sewers; dumping; open burning; and deep well injection.

Most of the programs in the western provinces are operationally alike from the standpoint of the product user and operate as the one in Manitoba described above. A minor exception includes the placement of the stewardship levy within the price structure. In Saskatchewan, the stewardship levy is a fee separate from the product's price; in Manitoba, the fee is buried in the price of the product. Alberta's regulation is still in process.

ii) **British Columbia**

In September 1992, British Columbia's *Return of Used Oil Regulation* came into effect. This regulation was the first of its type in Canada and required vendors of lubricating oil to provide a return facility for the used oil, or to enter into a contract with a local return facility. Unlike the stewardship programs in the other western provinces, British Columbia does not currently require producer take-back of filters or containers which the oil has contacted.

5) **Conclusions and Recommendations**

It is estimated that 250 million litres of waste oil are generated in Ontario each year. The fate of 75 million litres or 30% of the estimated waste stream is unaccounted for and is presumed to be in storage or disposed of in landfills, sanitary or storm sewers and directly onto land. Of the remainder of the waste oil stream, 27% was re-refined, 15% burned in cement kilns, 21% exported, typically for incineration, and 7% burned in small furnaces. The available estimates suggest that the portion of waste oil being re-refined is declining,

while the totals exported or burned as waste-derived fuel are rising.

In addition to the generation of used oil, an estimated 13 million oil filters are discarded in Ontario each year. The landfilling of these filters has been estimated to result in the annual deposit of 4.6 million litres of oil in Ontario landfills. The disposal of 130 million empty 1 litre oil containers in Canada each year has been calculated to result in the deposit of 5 million litres of oil into landfills.⁵⁴⁶

The disposal of waste oil is associated with significant environmental impacts. It is reported that 1 litre of oil can contaminated up to 1 million litres of water. In addition, waste oils are frequently heavily contaminated with a wide range of hazardous substances. Their disposal onto land, surface waters or landfills can result in the contamination of surface and ground waters, and interference with the operation of sewage treatment plants. The burning as fuel, particularly where air pollution control equipment is not in place, may result in the release of a wide range of conventional and hazardous air pollutants.

Most of the waste oil stream could be re-refined. In fact, current re-refining capacity in Ontario exceeds the supply of waste oil collected in the province for this purpose. This results in significant imports of used oil. However, it is important to note that re-refining processes also have significant environmental impacts of their own, particularly air emissions, and the generation of sludges and liquid wastes which can themselves be heavily contaminated with hazardous substances.

Ontario amended Regulation 347 in 1992 to permit the establishment of depots for the collection of waste oil, transmission and hydraulic fluids, oil filters and anti-freeze from DIY, rural and farm sources without a Certification of Approval, subject to certain conditions. However, participation in this program remains voluntary and number of operating depots is reported to be declining. The approach being taken by Ontario to this issue is in strong contrast with most other provinces, which have moved towards the establish take-back requirements for oil retailers.

Recommendations:

VIII-1. Province should move forward with establishment of take-back system for oil retailers through regulation. The take-back requirement should apply to all retail locations selling more than 500 litres/yr of oil or other lubricants. Locations selling less than 500 litres/yr should be required to enter into arrangement to deal with the designated wastes. The program should include waste oil and grease, transmission and hydraulic fluids, anti-freeze, oil filters, and oil and fluid containers.

VIII-2. Used oil, oil filters, and anti-freeze collected through the depot system should be required to be re-refined, except where this is impossible due to contamination.

VIII.3. A deposit, refundable upon return to the retailer, on oil, transmission and hydraulic fluid, and anti-freeze containers and oil filters should be applied to ensure their return to a collection depot.

VIII-4. The recycling of lubricants, oil filters, anti-freeze and containers collected through this program should be financed through the application of a charge at the point of sale for these products.

VIII-5. The imposition of a 1 cent per litre waste oil handling tax to deal with contaminated waste oils which cannot be recycled should be considered. Revenues from such a tax should be placed in a dedicated fund for this purpose.

Substantial quantities of waste oil are burned as 'waste derived fuel' in the province each year. Although the burning of waste oil as fuel has been associated with significant environmental problems, particularly related to air emissions, no specific emissions standards exist in the province regarding the practice.

VIII-6. All facilities burning waste oil generated on or off-site as waste derived fuel should be required to meet the emission requirements established through Ministry of Environment and Energy Guideline 7-A (Combustion and Air Pollution Control Requirements for New Municipal Waste Incinerators), pending the development of specific requirements for such facilities.

Particularly serious concerns have been raised regarding the environmental and human health impacts of the burning of waste oil in small space heating furnaces. Such furnaces have proliferated around the province in the past few years. There are also significant questions regarding the effects of this disposal practice on the viability of waste oil recycling operations.

VIII-7. The Ministry of the Environment should move to end the practice of burning waste oil in small space heating furnaces. No new burners should be approved by the Ministry, and a schedule should be established for the phase-out of existing burners.

The disposal of waste oil is associated with significant water pollution concerns as well. However, there are currently no prohibitions on the disposal of waste oil into surface waters or sanitary sewers. Similarly, despite the existence of concerns regarding groundwater contamination, there are no provincial limits on the land disposal of waste oil, with the exception of its use as a dust suppressant.

VIII-8. A regulatory prohibition on the disposal of waste oil, and transmission and hydraulic fluids into surface waters, and sanitary and combined sewers should be adopted under the Ontario Water Resources Act. In the interim, the Ministry of Environment's Model Sewer-Use By-Law should be amended to explicitly bar the disposal of waste oil, and transmission and hydraulic fluids into sanitary or storm sewers.

VIII-9. A similar prohibition should be adopted under the Environmental Protection Act regarding the disposal of waste oil, oil filters, hydraulic and transmission fluids in landfill or surface applications to land.

The province proposed wide ranging modifications to the regulatory regime for waste oil in July 1996. These would remove the handling and recycling of waste oil from the regulatory system for 'subject' wastes, except possibly in cases where the waste oil is contaminated with substances themselves classified as hazardous. The weakening of operating requirements for waste oil depots was also proposed.

These proposals were made despite the significant environmental effects associated with waste oil recycling and continuing evidence of incidents of the illegal disposal of waste oil under the guise of 'recycling' in the province. The implications of the August 1997 Plastimet fire, which involved a facility operating under a 'standardized approval' system similar to that established for waste oil depots in September 1992 must also be considered. The status of wastes generated by oil recycling operations in terms of generator registration and manifesting requirements under the Ministry's proposal is unclear.

Recommendations:

VIII-10. Waste oil recycling activities should continue to be subject to waste approvals, generator registration and waste manifesting requirements.

VIII-11. "Liquid Industrial Wastes" should continue to be defined as subject wastes for the purposes of Regulation 347.

VIII-12. The existing requirements for the exemption of waste oil collection depots from the requirement to obtain a Certificate of Approval should be reviewed with emphasis on staff training, storage limits, and fire and spills prevention and response. In particular:

- ° specific provisions for the training and certification of operators and staff should be established, with requirements for regular re-certification;*
- ° a requirement should be established that notice be given to the Ministry of Environment of intent to establish a collection depot prior to the commencement of operations, including the specific location and the identify of the owner and operator. The notice should be posted on the Environmental Bill of Rights Registry with a public comment period of not less than 30 days. Operations should not be permitted to commence until the notice of intent is acknowledged by the Ministry of Environment. The Ministry should have the option of declining to permit the commencement of operations or of imposing specific additional conditions on individual facilities;*
- ° the Ministry should not acknowledge a notice of intent unless it includes a confirmation from the local fire department that the facility is in compliance with fire safety requirements;*
- ° waste oil collection depot operators should be required to file quarterly reports with the Ministry of Environment regarding the amounts of waste*

oil, oil filters, oil containers, hydraulic and transmission fluids, and anti-freeze collected and their fates. These reports should be made available to the public, along with an annual summary report on depot operations across the province.

VIII-13. The specific locations of waste oil collection depots facilities and the identity of their owners and operators should be provided in the public registry proposed in Recommendation IV-2.

The repeal of requirements that marina operators provide for the collection of waste oil and containers also proposed by the Ministry of Environment and Energy as part of its Responsive Environmental Protection package.⁵⁴⁷ The Ministry indicated its intention to retain the regulation in November 1997.⁵⁴⁸

Recommendation:

VIII-14. The requirements of the Marinas Regulation regarding the provision of containers for the collection of waste oil and containers should be upgraded. This should include the addition of requirements for the provision of separate containers for fuels, lubricants, oil filters, and lubricant containers. Requirements regarding the storage, handling and recycling of these materials similar to those for waste oil collection depots should be established as well.

IX. HOUSEHOLD HAZARDOUS WASTES

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1) Introduction

Household hazardous waste (HHW) is the residual of products used in the home which are toxic, combustible, explosive, and/or flammable.⁵⁴⁹ This includes such materials as waste paints, solvents, pesticides, used motor oil, fuels, batteries and chemicals. HHW is estimated to constitute approximately 2% of the total hazardous waste stream.⁵⁵⁰ However, it poses significant environmental and human health threats. In addition to the immediate dangers associated with its handling and storage in the home, HHW has been implicated as a significant source of the toxic components of landfill leachate, hazardous emissions from incineration, and energy from waste facilities.

2) Regulatory Framework

Under the heading of Domestic Waste, all household hazardous wastes are exempt from the generator handling and disposal requirements established by Regulation 347 under the *Environmental Protection Act* at the point at which they are generated (i.e. in the home). However, this exemption does not include facilities where these wastes are collected, commercial establishments, or institutions, such as schools, government offices and hospitals.⁵⁵¹

A Certificate of Approval must be obtained from the Ministry of Environment and Energy for the operation of an HHW collection facility. Only those types of wastes listed in the Certificate can be accepted at the facility. The Ministry typically requires that an annual report be provided on the waste types and quantities received during the calendar year, as well as a summary of their ultimate disposal.⁵⁵² In order to manage household hazardous wastes at an HHW facility, the municipality must also be registered as a generator of hazardous waste under Regulation 347.

Once HHW has been collected at a facility, the operator is considered the owner of the waste, and is responsible and liable for its safe management. The operator may not allow the waste to pass beyond his or her control, or leave the facility unless it is transferred by a certified transportation company (carrier) to a certified disposal company (receiver) under the control of the Regulation 347 waste manifest system.⁵⁵³

A number of exemptions from these requirements have been provided for components of the HHW stream. The provisions regarding depots for the collection of used oil, oil filters, transmission and hydraulic fluids and anti-freeze are described in the preceding chapter. In addition, the Ministry of Environment and Energy has stated that it has granted an "administrative" exemption from the requirements of Regulation 347 for lead-acid battery recycling activities.⁵⁵⁴ However, there appears to be no statutory basis in the *Environmental Protection Act* for such an arrangement.

Air emissions from secondary lead smelters, the bulk of whose feedstock comes from lead-acid battery recycling are regulated by the federal government through the *Secondary Lead Smelter Release Regulations* made under *Canadian Environmental Protection Act*.⁵⁵⁵

3) Household Hazardous Waste Generation

Few figures are available regarding the generation of household hazardous wastes in the province of Ontario. Accurate data is difficult to obtain, as information regarding sales of products which become HHW is usually treated as proprietary information by brand owners. In addition, households may mix HHW with non-hazardous municipal solid wastes, store HHW in basements or garages, or dispose of it down drains, rather than deliver it to a HHW collection facility. This means that analyses of the household waste stream may not produce accurate indications of the total amounts of waste being generated.⁵⁵⁶

The only figure regarding HHW generation in the province published by the Ministry of Environment and Energy is 20,000 tonnes/yr. This was provided in the Ministry's 1992 Status Report on Ontario's Air, Water and Waste.⁵⁵⁷ It is roughly consistent with an estimate developed in 1990 by the Québec Commission d'enquete sur les déchets dangereux of 2.5kg per person per year.⁵⁵⁸

However, the MoEE's figure is significantly lower than the 1986 estimate developed for the Ontario Waste Management Corporation of 86,000 tonnes/yr. This included estimates of 17,000 tonnes of paint, 3,170 tonnes of solvents, 40,937 tonnes of used oils, 14,255 tonnes of antifreeze, 5,649 tonnes of pesticides, and 5,490 tonnes of other wastes.⁵⁵⁹ Environment Canada's 1996 State of the Environment Report provides an estimated national average of 6.8kg/year, based on a 1994 report from the British Columbia Waste Reduction Commission.⁵⁶⁰ This would suggest a total for Ontario in the range of 75,000 tonnes/yr.⁵⁶¹

No data or estimates are available regarding trends in household hazardous waste generation. In the absence of any specific information, it may be assumed that generation is stable or increasing slowly as levels of economic activity and population expand.

4) Household Hazardous Waste Stream Composition

A detailed study of the composition of the Ontario household hazardous waste stream was completed by the Association of Municipal Recycling Coordinators (AMRC) in 1996. The study involved household hazardous waste collected by the Region of Peel, the Region of Halton, the Kingston Area Recycling Corporation, Centre and South Hastings Recycling Board, City of Stratford, and the Essex-Windsor Solid Waste Authority beginning in May 1995. The results of the AMRC study are outlined in **Table IX-1**.⁵⁶²

Table IX-1: Ontario HHW Stream Composition (Six Municipalities - 1996)

HHW Category	Percent of Overall Composition	Top 3 Product Types	Top 3 Brand Owners
Paint	40.7%	Latex Paint Alkyd Paint Enamel Paint	Colour Your World (18.7%) St.Clair (12.4%) Sears (8.2%)

Flammables **	22.4%	Unknown Stain Cleaners	Unknown (23.6%) Canadian Tire (9.2%) Beaver Lumber (4.5%)
Oils	17.1%	Motor Oil Oil Filters	Unknown (54%) Canadian Tire (21%) Quaker State (12.6%)
Vehicle Batteries	11.4%	N/A	Canadian Tire (30.1%) unknown (24.9%) AC Delco (16.9%)
Gas Cylinders	4.5%	Large Propane Small Propane Other	<u>Large Propane</u> unknown (51.5%) Wolfdale Engineering (31.9%) Engineering Products (6.5%) <u>Small Propane</u> Coleman Canada (42.3%) Canadian Tire (30.1%) Unknown (9.3%)
Bases	1.0%	Other Cleaners Wax Strippers	Canadian Gypsum (32.3%) unknown (12.0%) Domtar Gypsum (7.2%)
Antifreeze	1.6%	N/A	unknown (47.8%) Canadian Tire (30.7%) First Brands (6.5%)
Pesticides	0.5%	Insecticide Herbicide Other	Unknown (16.2%) S.C. Johnson Wax (11.6%) CIBA-Geigy (9.2%)
Oxidizers	0.5%	Fertilizer Pool Chemicals Disinfectant	Co-op (14.4%) Unknown (12.4%) Olin Corporation (10.9%)
Acids	0.3%	Muriatic Acid Other Cleaners	unknown (22.6%) Sheffield Bronze Power (9.8%) Ecolab (5.9%)
Pharmaceuticals	0.1%	Prescription & non-prescription medication,unknown	N/A
Household Batteries	0.0%	Alkaline,Button Nickel-Cadmium	Not recorded.

** (includes stains, cleaners, driveway sealers, fuel, rust/metal paint, adhesive, paint remover/thinner, liquid plastic).

HHW Stream Composition

1996 data from 6 municipalities

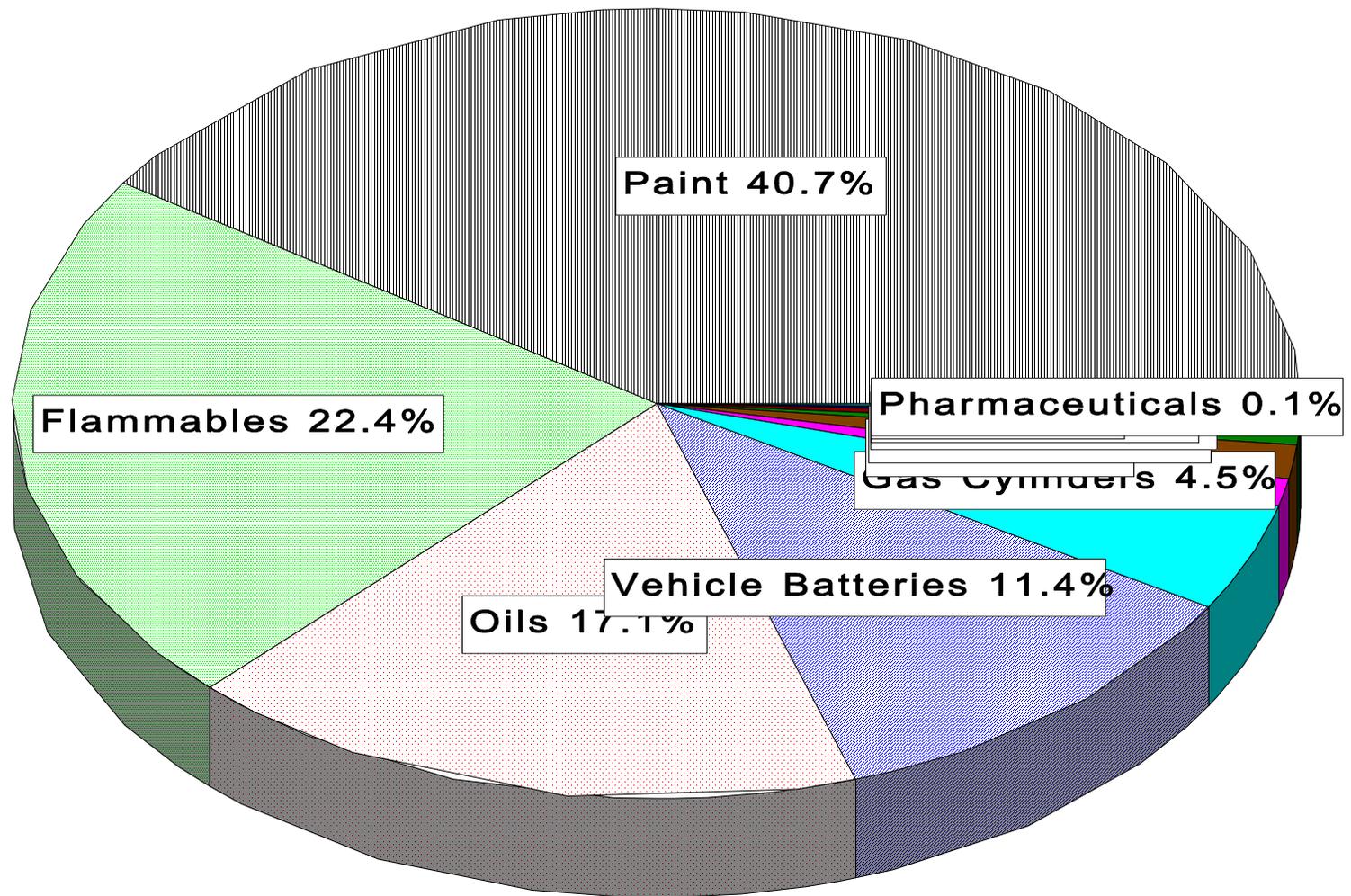


Chart 9: Ontario household hazardous waste stream composition (1996).

The HHW stream includes a number of components which are particularly problematic. These include household and automotive batteries, used oil, and pesticides.

i) Household Batteries

Household batteries may contain a wide range of hazardous materials. These may include mercury, cadmium, and nickel, all of which have been placed on the List of Toxic Substances under the *Canadian Environmental Protection Act* (CEPA), or assessed as "toxic" for the purposes of the Act.⁵⁶³ Particular concerns emerged in the 1980's when a dramatic increase in sales of alkaline batteries, which contained approximately 100 times more mercury than conventional (carbon-zinc) batteries, took place.⁵⁶⁴

The generation of waste household batteries can be assumed to be roughly equivalent to annual sales. Ontario accounts for approximately 42% of the Canadian battery market, with 95 million units sold in 1994/95. The composition of battery sales for that year in Ontario is presented in **Table IX-2**.

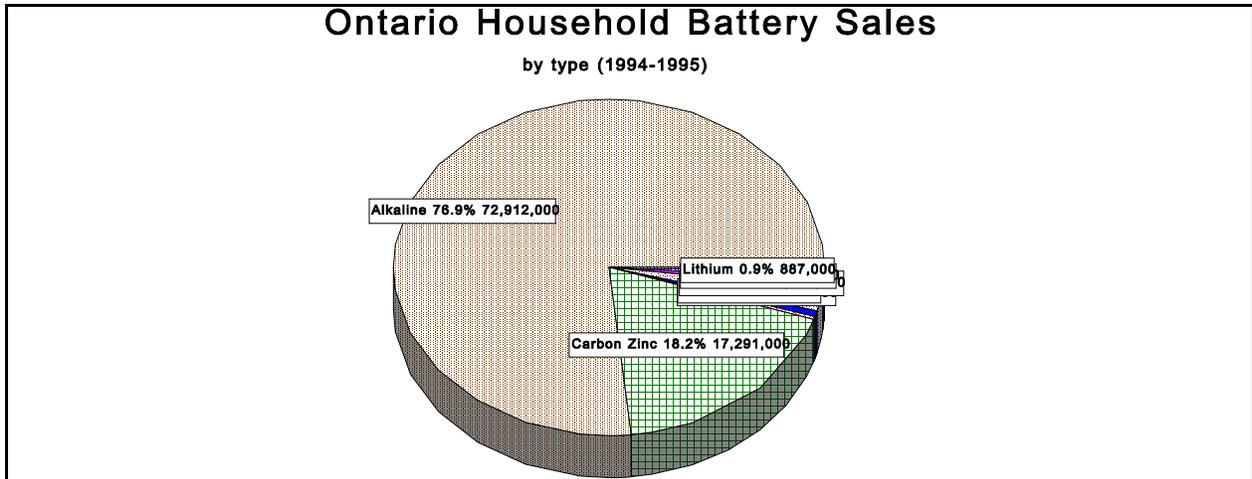
It is important to note that sales of Ni-Cad batteries on a cell or pack basis only account for 15% to 20% of total Ni-Cad battery sales. The remaining 80%-85% of the market are units sealed within consumer or industrial products.⁵⁶⁵ U.S. estimates of total Ni-Cad sales are 300-400 million units/yr.⁵⁶⁶ This would suggest sales of 30-40 million units/yr in Canada. Ni-Cad battery sales are reported to have increased significantly in Canada over the past few years.⁵⁶⁷

It was estimated in 1992, on the basis of 1991 household battery sales figures, that 4.3 tonnes of mercury, and 47.3 tonnes of cadmium entered the Canadian environment in discarded household batteries each year.⁵⁶⁸ This was calculated to account for 35% of the mercury and 33% of the cadmium in the municipal solid waste stream.⁵⁶⁹

Table IX-2: Ontario Household Battery Sales (1994/95)

Battery Type	Total Sales
Alkaline	72,912,000
Carbon Zinc	17,291,000
Ni-Cad	1,980,000
Mercury	182,000
Silver	631,000
Zinc Air	949,000
Lithium	887,000
Metal Hydride	0
Total	94,832,000*

*(41.5% of Canadian total sales of 219,546,000 units)



Canadian sales of mercury cell batteries have decreased from 3 million units in 1990 to 700,000 units in 1995.⁵⁷⁰ In addition, the Canadian battery industry had made a voluntary commitment to the elimination of the intentional use of mercury in household batteries by the end of 1996,⁵⁷¹ and states that this commitment has been met.⁵⁷² Mercury use in batteries in the United States is required to be phased out under federal legislation passed in May 1996.⁵⁷³

Efforts to recycle household batteries have been associated with serious environmental problems.⁵⁷⁴ Indeed, some analysts have concluded that with the exception of nickel-cadmium batteries, disposing of waste household batteries in sanitary landfills may present a lower level of environment risk than attempting to recycle them.⁵⁷⁵

ii) Vehicle (Lead-Acid) Batteries

A 1991 estimate gives a figure of 7,119,882 lead-acid batteries discarded in Canada in Canada.⁵⁷⁶ Voluntary return programs for vehicle batteries are offered by some larger retailers,⁵⁷⁷ and the lead-acid battery recycling industry claims that 90% of lead-acid batteries disposed of in Canada are recycled.⁵⁷⁸

Serious environmental problems have emerged in relation to lead-acid battery recycling operations in the past. There have been incidents of lead contamination documented at all three secondary lead smelter sites in Ontario, the Tonolli Canada facility in Mississauga, Canada Metal Co in Toronto, and the now decommissioned Toronto Refiners and Smelters plant in Toronto.⁵⁷⁹ There have also been incidents of the illegal disposal of sulphuric acid at battery breaking facilities in Ontario.⁵⁸⁰

No specific information is available on the fate of waste lead-acid batteries generated in Ontario. This is a result of the Ministry of the Environment's decision to grant lead-acid battery recycling activities an "administrative" exemption from requirements of Regulation 347.⁵⁸¹ This means that they have not been subject to generator registration and manifesting requirements. Consequently, there are no records of the movement or fate of lead-acid batteries sent for recycling in Ontario. There is no legal basis for such an exemption in the *Environmental Protection Act*.

On April 6, 1992, Eric Battery Inc., and its manager, Taylor George Gordon, were fined a total of \$300,000 and \$25,000 respectively for offences relating to the discharge of battery acid wastes. The fines were the result of two separate conventions.

Eric Battery Inc. is located in Port Colbourne. The Company is in the business of dismantling automobile batteries and selling the casings as scrap metal for reuse. The acid waste from the batteries is collected in pits and pumped to an acid storage tank located outside of the plant.

From there, a licensed hazardous waste hauler takes the liquid waste for proper disposal. However, in this case, when Mr. Gordon became manager of the plant, he used students to pump liquid from the two pits inside the building to a loading dock. The liquid was battery acid. Mr. Gordon then had the acid pumped out into a nearby field. The students, who were not licensed haulers, suffered skin irritation as a result of handling the acid.

Soil Samples taken by the Ministry of the Environment found high levels of lead contamination.

Excerpted from: Ministry of the Environment, Offences Against the Environment: Environmental Convictions in Ontario 1992 pg.11.

Imports and exports of lead-acid and other types of batteries for recycling or disposal are required to be approved and reported under the CEPA Hazardous Waste Import/Export Regulations. Environment Canada reports that approximately 52,000 tonnes of waste batteries were exported from Canada in 1995. 76,000 tonnes of waste batteries were imported in the same year.⁵⁸² The overwhelming bulk of this traffic consists of lead-acid batteries.

iii) Waste Motor Oils

The Ministry of Environment and Energy and the Canadian Petroleum Products Institute have estimated that approximately 40 million litres of automotive lubricating oil are sold to the do-it-yourself market in Ontario each year.⁵⁸³ Estimates of the amounts of automotive lubricating oil consumed or lost in use range from 25% to 50%.⁵⁸⁴ This would suggest that the do-it-yourself sector in Ontario may generate between 10 and 20 million litres of waste crankcase oil each year. With the exception of waste oil collected through HHW programs, the fate of this waste oil has been largely unknown. It may be in storage, disposed of into sewers, or with ordinary municipal solid waste.

As described in detail in the chapter dealing with used oil, the improper disposal of waste oil can have significant environmental effects. It has been estimated, for instance,

that one litre of waste oil can contaminate up to one million litres of water.⁵⁸⁵ In addition, used oil may be contaminated by chemical additives intended to improve performance, or simply as a result of its use. Hazardous substances identified as being present in waste crankcase oil include a wide range of heavy metals and persistent toxic substances.⁵⁸⁶

It has also been noted that the disposal of empty containers contaminated with residual oil results in the release of significant amounts of oil into landfills, where it may eventually contaminate groundwater. The Recycling Council of Ontario has estimated that the disposal of 130 million 1 litre oil containers across Canada each year results in the deposit of 5 million litres of oil into Canadian landfills.⁵⁸⁷ Similarly, the Council has estimated that the disposal of 34 million used oil filters each year results in the deposit in landfills of 12 million more litres of oil.⁵⁸⁸

iv) Pesticides

It has been reported that small amounts (i.e.<2kg) of de-registered or banned pesticides, including DDT and Chlordane have been collected during municipal household hazardous waste collection days.⁵⁸⁹

5) Household Hazardous Waste Collection Programs

i) Municipal Programs

The numbers of household hazardous waste collection programs in Ontario expanded rapidly between 1986 and 1993. This growth is shown in **Table IX-3**.⁵⁹⁰

Table IX-3: HHW Collection Programs in Ontario

Year	Number of Municipalities Offering Programs	Number of Households Participating	Total HHW collected (Tonnes)
1986	5	1338	34.871
1987	14	2958	100.51
1988	25	4923	188.003
1989	33	19,384	966.326
1990	41	33,505	1,345.821
1991-92	N/A	N/A	>1,200 ⁵⁹¹
1992-93	83	N/A	1,867.742 *
1993-94	27	N/A	507.891*
1994-95	23	N/A	294.134*
1995-96	43	N/A	483.463*

* MoEE funded programs only

The Ministry of Environment and Energy significantly reduced its funding for municipal HHW programs in its 1993-94 budget. This appears to have resulted in a decline in the number of programs being offered, particularly by smaller municipalities.

The elimination of provincial funding for all municipal HHW programs was announced in November 1995. A number of larger municipalities, including Metropolitan Toronto (**Table IX-4**), have operated HHW collection programs without provincial support. In addition, some funds have been made available through Environment Canada's Action 21 program to support HHW collection activities.⁵⁹² The AMRC reports that a total of 61 HHW collection programs were offered by municipalities in 1996 resulting in the collection of 8,100 tonnes of waste.⁵⁹³

Table IX-4: HHW Collection Programs in Metro Toronto

Year	Number of Participants	Total HHW Collected (Tonnes)
1991	28,006	883
1992	30,756	928
1993	35,351	1,069.5
1994	42,890	1,163
1995	42,271	1,281

ii) Collection Rates

Concerns have been raised that despite the significant expansion of municipal HHW collection programs, only a small portion of the HHW estimated to be generated within the province is being collected. AMRC's total of 8,000 tonnes of HHW collected in 1996 would constitute approximately 40% of the lowest total estimate of HHW generation provided by the MoEE (20,000 tonnes/yr). This is significantly higher than the 1991 capture rate

estimated by the Metropolitan Toronto Works Department of 16%. The fate of the remainder of the HHW stream is uncertain, although large portions may be in storage in garages, cupboards and basements.

iii) Program Costs

The low rate of capture of estimated HHW generation has led to concerns over the costs of delivering HHW collection programs.⁵⁹⁴ However, the costs of delivering HHW programs appears to have fallen significantly over the past five years. For Ministry of Environment and Energy sponsored programs, the average cost has fallen from approximately \$2 per litre/kg collected in 1992-93 to less than \$1 per litre/kg collected in 1995/96.⁵⁹⁵ For its part, the Metropolitan Toronto Works Department provides the figure of \$3.62/kg in 1991 and \$1.03/kg in 1995.⁵⁹⁶

iv) Industry Sponsored Programs

A number industry sectors have initiated programs in Ontario to collect waste products which may become HHW.

Batteries

A number of larger retailers have established return to vendor programs for used lead-acid batteries. Some voluntary return programs for some specialized batteries have been established as well. Bell Mobility, for example, takes back Nickel-Metal Halide, Ni-Cad and Alkaline batteries from cellular phones.⁵⁹⁷

The Canadian Household Battery Association commenced a stewardship program to recover used nickel-cadmium batteries in September 1997. It is managed by an industry-funded not-for-profit organization known as the Rechargeable Battery Recycling Corporation (RBRC). The batteries are collected from retail outlets, municipal programs, commercial and institutional generators and through the mail. The batteries are then sent to a cadmium recovery facility in Ellwood City, Pennsylvania operated by INMETCO Ltd.⁵⁹⁸

Waste Oil

Approximately 350 retailer operated depots for the collection of waste lubricating oil have been established in Ontario through a program initiated in 1992. This program, which was originally intended to be mandatory and result in the establishment of more than 2,000 depots, is described in detail in the chapter VII of this report dealing with Waste Oil.

Paint and Other Materials

Home Hardware has established a pilot collection program for waste paint in City of London for their brand name of paint.⁵⁹⁹ Voluntary return to vendor programs for pharmaceuticals have been established in some cases as well.⁶⁰⁰

6) Fate of Materials Collected Through HHW Programs

Arrangements for the disposal of HHW collected through municipal programs are made by each individual sponsoring municipality. These usually involve entering into a contract with a licensed hauler to remove the HHW from the collection site and deliver it to appropriate disposal facilities. With the exception of materials which can be recycled, this usually means incineration or landfilling. The Ministry of the Environment prescribes waste management procedures for the major HHW streams as outlined in **Table IX-5**.⁶⁰¹

Table IX-5: HHW Disposal Options

HHW Category	Reuse/Recycle Possibilities	Disposal Options
Acids and Bases	None.	Disposal at secure landfill. ⁶⁰²
Oxidizers	None.	Disposal at secure landfill. ⁶⁰³
Solvents	Recycling through distillation possible depending on quantity & number of different solvents collected.	Incineration at licensed facility.
Paint	Reuse, or lab-packed or bulked for recycling. ⁶⁰⁴	Incineration or use as secondary fuel.
Oil	Can be sent to recycler.	Incineration or use as secondary fuel.
Pesticides	None.	Disposal at secure landfill or incineration. ⁶⁰⁵
Household Batteries	None.	Secure landfill.
Lead-Acid Batteries	Can be sent to recycler. Industry estimates 90% of lead-acid batteries disposed of in Canada are recycled.	Dispose at licensed treatment, storage or disposal facility (TSD) (i.e. landfill).
Aerosols	None.	Dispose at licensed TSD facility.
Propane Cylinders	Can be sent to supplier to shredded	Dispose at licensed TSD facility.
Pharmaceutical Wastes	None.	Secure Landfill or incineration.
Antifreeze	Bulk and send to be re-refined.	
Miscellaneous Chemicals	Unknown.	Dispose at licensed TSD facility.

The Metropolitan Toronto Works Department gives the figures outlined in **Table IX-6** for the fate of HHW collected through its programs in 1995.⁶⁰⁶

Table IX-6: HHW Disposal by Metropolitan Toronto

Material	Method	Volume (Kg)
Paints (latex and alkyd/oil based)	Fuel blending in cement kilns.	85,171
Paints (latex and alkyd/oil based)	Reused/Recycled	329,338
Flammable Materials (e.g. solvents, stains)	Fuel blending/cement kilns	178,368
Motor Oils	Fuels Blending/Re-refining	195,488
Propane Cylinders	Refurbished/Metal Recovery	45,070
Automotive Batteries	Metals and Plastics Recycling/Chemical Treatment	129,789
Antifreeze	Chemical Treatment	13,175
Total		949,399

These fates accounted for 76.2% of the HHW collected in 1995 by Metro Toronto. The remainder of the wastes collected (296 tonnes) were incinerated or landfilled.⁶⁰⁷ On a province wide basis, the portion of collected wastes being recycled (excluding use as fuel) has risen from 37% in 1992-93 to 48% in 1995/96.⁶⁰⁸ This largely reflects increased recycling rates for paints and solvents. However, the AMRC reports that paint recycling efforts have been less successful than originally hoped, principally due to weak markets for secondary paint.⁶⁰⁹

HHW programs result in the diversion of wastes from conventional landfills. However, a significant portion of the waste stream is ultimately incinerated or burned as fuel, or sent to secure landfills. These fates are associated with significant environmental impacts of their own. The AMRC reports that a growing number of municipalities are providing facilities and opportunities for the reuse of specific items, such as adhesives, aerosols, cleansers, driveway sealer, paint, propane tanks solvents and stains as part of their HHW programs. This reduces the amounts of waste sent to disposal and the associated disposal costs. Of the 61 HHW programs offered by municipalities in 1996, 22 included reuse components.⁶¹⁰

7) Recent Policy Initiatives In Ontario

i) Termination of Provincial Support for HHW Programs

The termination of provincial funding assistance for municipal household hazardous waste collection programs was announced on November 29, 1995. Between 1992-1993 and 1995-96 MoEE grants provided between 22% and 49% (the proportion varied year to year) of the funding for municipal HHW programs.⁶¹¹ The impact of the withdrawal of provincial funding on programs offered in the current year is reported by the AMRC to have been limited. However, major impacts on services are anticipated in future years,⁶¹²

particularly as other aspects of the province's efforts to shift responsibilities between the provincial government and municipalities are implemented.

Municipalities are considering a number of potential responses to this situation. The Centre and South Hastings Recycling Board, which has been regarded as one of the province's leaders in waste diversion efforts, has introduced a user fee of \$10 per vehicle delivering HHW to collection events. However, despite advertising and promotional efforts, the introduction of user fees is reported to have resulted in a significant drop in participation HHW collection programs.⁶¹³

Municipalities are also seeking greater industry support for HHW programs.⁶¹⁴ However, these efforts have received little support from the province. There have been, for example, no indications that the province might consider introducing requirements that firms placing materials which may become HHW onto the marketplace take some responsibility for their management, along the lines of what has been done in British Columbia and other jurisdictions.

ii) **Responsive Environmental Protection**

In July 1996 the Ministry of Environment and Energy made a number of proposals which would affect the management of HHW in Ontario in a number of other ways. In particular, the province proposed to establish a "standardized approval" approval system for HHW collection depots, similar to that which exists for pesticide container depots and waste oil collection depots.⁶¹⁵ At the same time, the Ministry proposed to remove some of the existing administrative and operational requirements for these "selected waste depots." The Ministry also proposed to permit the establishment of similar depots to collect such wastes as pharmaceuticals, pesticides and paints.⁶¹⁶

In addition, Responsive Environmental Protection proposed to expand the "administrative" exemption granted to lead-acid battery recycling operations from the requirements of Regulation 347 to include all other types of batteries.⁶¹⁷ The Ministry also proposed that "manufacturer controlled networks," within which original product manufacturers take responsibility for collecting and managing wastes generated from products they produce, be exempted from the approvals and administrative requirements under the *Environmental Protection Act* and Regulation 347, normally needed to ship these wastes.⁶¹⁸

The Ministry re-iterated its intention to proceed its proposed changes to the regulatory regime for 'subject' waste in November 1997, although no specific reference was made to the proposals made in July 1996 with respect to HHW.⁶¹⁹

8) **Recent Initiatives in Other Jurisdictions**

In contrast the Ontario government's reliance on voluntary measures by industry to deal with HHW, a number of other provinces, the U.S. federal government and several U.S. states have established mandatory requirements regarding the recycling of batteries,

paints, and other HHW stream components.

i) British Columbia

British Columbia has emerged as the most active of the Canadian provinces in the area of HHW management. The establishment of industry responsibility for the life-cycle of hazardous products has been a major theme of the province's initiatives.

In September 1992, British Columbia's *Return of Used Oil Regulation* came into effect. This regulation was the first of its type in Canada and required vendors of lubricating oil to provide a return facility for the used oil, or to enter into a contract with a local return facility. A number of other provinces have established used oil recovery programs following British Columbia's lead. These are described in detail in the chapter of this report on waste oil.

In September of 1994, the government of British Columbia adopted the *Post-Consumer Paint Stewardship Program Regulation*. The regulation requires paint manufacturers to submit stewardship programs to the minister for approval. This resulted in the establishment of two systems for the recovery of waste paint. Two manufacturers are recovering their own post-consumer returned products through permanent collection sites in retail outlets. The remaining 47 brandowners are establishing an industry, not-for-profit association called the Paint Care Association.

The Association is allotted the fee charged on its brandowners' new paint in order to cover the cost of a mobile collection system. The program started in the Lower Mainland of British Columbia and spread to the entire province in 1996. In June of 1996, British Columbia made its paint recycling regulations more stringent by requiring brand owners to recycle or re-use at least 70% of the collected post-consumer paint and to file quarterly reports with the Ministry on the amount of paints collected.⁶²⁰

British Columbia has also established a regulation requiring the solvent, pesticide and fuel industries to set up collection and disposal programs for their waste household products. Manufacturers were required to submit plans for safe and convenient collection programs for wastes such as turpentine, paint thinners, lacquers, polishes, paint strippers, varsol, camp fuels, unused gasoline and household pesticides by the end of June 1997.⁶²¹

In November 1996, the pharmaceutical industry set up a program to collect unwanted and leftover drugs in the province.⁶²²

ii) Other Provinces

A number of other provinces, including Alberta, Nova Scotia and Quebec, are moving to establish producer responsibility programs for HHW stream components as well. The principle focus of these efforts has been on paint, waste oil and pesticides.⁶²³

iii) United States

The *Mercury Containing and Rechargeable Battery Management Act* was enacted in May 1996.⁶²⁴ The Act is divided into two parts. The first deals with the recycling of rechargeable batteries; the second deals with the phasing out of mercury containing batteries. The Act sets out the powers and responsibilities of the Administrator of the Environmental Protection Agency in these matters.

Recycling of Rechargeable Batteries

The Act states that it has two purposes with regard to the recycling of rechargeable batteries:

- 1) to provide for uniform labeling and streamlined regulatory requirements for battery collection programs; and
- 2) to encourage voluntary industry programs by eliminating barriers to funding the collection and recycling or proper disposal of used rechargeable batteries.

To meet the first purpose, labelling requirements regarding recycling and disposal are imposed on producers or importers of batteries. The selling of regulated batteries without proper labels is prohibited. The batteries must also be either easily removable or separate from consumer products. Some remanufactured products and all batteries produced for export only are exempted.

The second purpose is addressed in section 104 of the Act. This section states that those batteries addressed in this Act which, when discarded, would otherwise be considered hazardous wastes shall be regulated in essentially the same manner as batteries regulated under the EPA's "Universal Waste Rule."⁶²⁵ The collection, storage and transportation of batteries which are not hazardous wastes are not subject to the Universal Waste Rule. Of the batteries listed in Part II of this Act, none, except mercuric-oxide batteries, are considered hazardous waste.

However, because of their heavy metal content, used rechargeable batteries are considered to be hazardous waste. The effect of this section is to lessen the regulatory requirements on the collection and transportation of rechargeable batteries, although the regulations for destination facilities remain the same as for other hazardous waste.

Previously, rechargeable batteries were subject to the hazardous waste regulatory regime, including: licensing and manifesting requirements for hazardous waste transporters; permitting requirements for the storage of hazardous waste; a requirement that hazardous waste be disposed of in specially permitted landfills; and various reporting and inspection requirements. Under the Universal Waste Rule, rechargeable battery handlers and transporters are subject to separate, less stringent requirements which distinguish between "large quantity handlers of universal waste" (more than 5, 000 kilograms of universal waste at one time) and "small quantity handlers of universal waste" (less than 5, 000 kilograms at once). For large quantity handlers, the rule requires that the handler notify the Administrator or authorized State agency of its activities and shipments, ensure appropriate employee training in handling such wastes, and track and keep records

of shipments. Transporters and destination facilities are also subject to such requirements.

This section also provides that the Administrator may not exercise her discretion under 40 CFR 260.40 to impose further regulations on the recycling of batteries, on a case-by-case basis, if they are "being accumulated or stored in a manner that does not protect human health and the environment." The exact effect of this exemption is not clear, but it appears to prevent the Administrator from toughening the rules governing the recycling of rechargeable batteries and to prevent public input into those rules. A more thorough investigation of the Administrator's discretionary powers would be required before any definite conclusion could be made.

This Act also has the effect of superseding any State legislation on these matters, in order to ensure a uniform regime throughout the United States. This is true for all sections of the Act. There are provisions for the Administrator to allow States to regulate and enforce rules and requirements which essentially duplicate the Act and its regulations. Individual States may not vary these rules without the authorization of the Administrator. Violations of these regulations are enforced under the *Solid Waste Disposal Act*.

The Management of Mercury-Containing Batteries

The Act also proposes to phase out the use of batteries containing mercury. Alkaline-manganese batteries and zinc-carbon batteries with a mercury content that were intentionally introduced are prohibited. If the mercury content is incidentally present in other materials, these batteries are not prohibited. Button cell alkaline-manganese batteries may have 25 milligrams of mercury. Button cell mercuric-oxide batteries are prohibited for use in the United States. Other mercuric-oxide batteries are prohibited unless the manufacturer or the importer:

- (1) identifies a collection site in the United States that has all government approvals, to which people may send used mercuric-oxide batteries for recycling or proper disposal;
- (2) informs each of its purchasers of these collection sites; and
- (3) informs each of these purchasers of a telephone number that the purchaser may call to get information about sending these batteries for recycling or proper disposal.

The Administrator is able to exempt batteries from these regulations if a new use for a battery technology is proposed.

9) Conclusions and Recommendations

Estimates of HHW generation in the province range from 20,000 tonnes to over 80,000 tonnes/year. No data is available regarding trends in HHW generation. Paint and waste motor oil appear to constitute the largest component of the HHW stream by weight and volume, followed by stains, cleaners, fuel, driveway sealers, adhesives and paint remover/thinners. The stream also includes smaller quantities of other hazardous wastes, including batteries, pesticides, pharmaceuticals, bases, acids, oxidizers and anti-freeze.

A dramatic expansion in the number of HHW collection programs offered by municipalities took place between mid-1980's and early 1990's. The number of programs offered by municipalities has declined since then, principally as a result of reductions in Ministry of the Environment support. The amounts of waste collected through municipal programs appears to have levelled off since the early 1990's in the range of 8,000 tonnes/year. This would constitute not more than 40% of the household hazardous waste estimated to be generated in the province.

The elimination of provincial funding for municipal HHW programs was announced in November 1995. This is likely to have a significant impact on program delivery, especially in rural areas. Preliminary efforts to introduce user pay arrangements for HHW services by municipalities do not appear to have been successful. Indeed, they have resulted in a significant decline in program participation by residents.

Some elements of the HHW stream collected through municipal programs, such as solvents, waste oils, paint, antifreeze, gas cylinders, and lead-acid batteries may be recycled or reused. The remainder is incinerated and/or disposed of in a secure landfill, most commonly the Laidlaw Environmental Services facility at Sarnia. In addition, the recycling processes of some elements of waste stream, particularly solvents, used oil, and lead-acid batteries are themselves associated with significant environmental impacts. A number of municipalities are making efforts to facilitate the reuse of HHW materials collected through their programs in order to reduce the amounts sent for recycling or disposal.

Batteries

Lead-acid battery recycling activities have been granted an "administrative" exemption from the requirements of Regulation 347. There is no legal basis for this arrangement under the *Environmental Protection Act*. This 'exemption' means that no information is available regarding the generation, transportation and fate of lead-acid batteries in the province, except for those which imported or exported and consequently fall under the requirements of the CEPA Hazardous Waste Import/Export Regulations. This is despite the significant environmental impacts associated with lead-acid battery recycling, and a history of problems with the illegal disposal of waste materials from such operations.

Furthermore, in July 1996, the Ministry of Environment and Energy proposed to expand this 'exemption' to all types of battery recycling operations. This is despite the consideration that batteries may contain a wide range of toxic substances, including mercury, cadmium, lead, and nickel.

Recommendation

IX-1. The 'administrative' exemption from the requirements of Regulation 347 for lead-acid battery recycling activities should be withdrawn.

IX-2. Other battery recycling operations and activities should not be exempted from the

approvals, generator registration and manifesting requirements of Part V of the Environmental Protection Act and Regulation 347.

The United States has moved to phase out the use of batteries containing mercury through the *Mercury Containing and Rechargeable Battery Management Act* of May 1996. This reflects concerns over the rapid increase in sales of alkaline batteries which contained mercury in the 1980's. Alkaline-manganese batteries and zinc-carbon batteries with a mercury content that were intentionally introduced are prohibited under the Act. The Canadian battery industry has implemented a similar ban on a voluntary basis.

Recommendation:

IX-3. The manufacturing, sale, import, and export of alkaline-manganese and zinc-carbon batteries with mercury content that were intentionally introduced should be banned through a regulation made under the Canadian Environmental Protection Act.

Regulatory Reform

In July 1996 the province proposed a number of significant changes to regulatory regime affecting HHW management. HHW collection depots would be placed on a "standardized approval" system. In addition, the exemption for lead-acid battery recycling operations would be enlarged to include all battery recycling operations, and the current 'permit by rule' system for depots collecting used oil and pesticide containers would be expanded to provide for the creation of depots for the collection of waste pesticides, pharmaceuticals, paints and batteries.

Furthermore, the Ministry proposed that "manufacturer controlled networks," within which original product manufacturers would take responsibility for collecting and managing wastes generated from products they produce be exempted from the approvals and administrative requirements under the *Environmental Protection Act* and Regulation 347, normally needed to transport these wastes.⁶²⁶

These proposals would significantly weaken the requirements for facilities collecting and storing HHW materials. This is of particular concern in light of the report of the Ontario Fire Marshal on the July 1997 fire at the Plastimet recycling facility in Hamilton, which was operating under a similar 'standardized approval' and exemption regime. The Fire Marshal recommended that the requirements for such sites be significantly strengthened, particularly in terms of site location, and fire and spills protection.⁶²⁷

There may be value in the establishment of a modified regulatory regime which falls between the requirements to obtain a formal certificate of approval, and total exemptions from approval, registration and manifesting requirements, for such activities as the collection of HHW materials from members of the public. However, the Plastimet experience emphasizes the need for such a system to establish adequate and enforceable requirements in relation to the protection of the environment, public safety and public health. Issues of public accountability and community right to know must also be

addressed in the design of such a system.

Specific recommendations regarding the strengthening of requirements for the operation of collection depots for waste oil and pesticide containers are presented in Chapters VII and VIII of this report. The basic elements of these proposals should be applied to all sites collecting HHW materials from the public which are not subject to full certificate of approval requirements. The transportation, storage, recycling processing or disposal of HHW materials, once collected, should remain subject to requirements to obtain certificates of approval and for the manifesting of their transportation.

Recommendation:

IX-4. The Ministry of the Environment should establish specific requirements regarding the operation of sites which collect HHW from the public which are not subject to certificate of approval requirements. These requirements should address:

- staff training, with particular emphasis on regulatory requirements, occupational health and safety, and fire and spill prevention and response;*
- storage limits and requirements related to storage practices;*
- facility location;*
- provision of notice of intent to establish facilities to the Ministry of the Environment, and a requirement for acknowledgement by the Ministry prior to the commencement of operations. Notice of intent should also be posted on the Environmental Bill of Rights registry for a minimum of 30 days for public comment. The Ministry should have the option of declining to permit the commencement of operations or imposing specific additional conditions on individual facilities;*
- ensuring that the commencement of operations is not permitted until a confirmation of compliance with fire protection requirements is received by the Ministry;*
- regular reporting requirements to the Ministry, and public access to such reports; and*
- the reporting of the location and ownership of operating sites through the public registry proposed in Recommendation IV-2.*

Producer Responsibility

Despite its withdrawal of financial support to municipal HHW programs, the province has taken no steps to require greater producer responsibility for handling of HHW. This is in stark contrast to the approaches being taken by many other provinces, particularly British Columbia, and some U.S. jurisdictions. In British Columbia, for example, the province has established requirements that manufacturers and retailers provide for the collection, recycling or disposal of a wide range of HHW, including used oil, paint, solvents, pesticides and fuels.

Limited voluntary programs have been established by industry for the collection and

recycling of lead-acid and nickel-cadmium batteries, batteries from cellular phones, used oil, and waste paint. However, in the absence of any provincial initiatives in this area, manufacturers and retailers in Ontario have virtually no incentive to make provision for the collection of their products when they become HHW, either through their own programs, or by giving support to municipally-delivered services.

Recommendations:

- IX-5. The Province should move towards the establishment of life-cycle producer responsibility for the collection, recycling and disposal of products which may become household hazardous wastes, including waste oil, paint, pesticides, fuels, batteries and solvents. The establishment of deposit/refund and return to retailer requirements should be considered for products for which producer responsibility arrangements are not made by manufacturers or retailers.*
- IX-6. Waste collection depots established as elements of producer responsibility systems should be subject to the requirements set out in Recommendation IX-4. Other elements of 'manufacturer controlled networks' should be subject to regular certificate of approval requirements regarding systems and facilities handling 'subject' wastes.*

SUMMARY AND CONCLUSIONS

This project set out, in the aftermath of the Environmental Assessment Board's decision against the Ontario Waste Management Corporation's (OWMC) proposed hazardous waste treatment and disposal facility, to assemble as complete a picture as possible of the management of hazardous waste, including other forms of 'subject' waste, in Ontario. In particular, the project sought to identify the gaps in the publicly available data and information about the generation and fate of hazardous wastes in the province, and in the underlying regulatory framework. On the basis of this review, it sought to propose measures to address these gaps.

Hazardous Waste Generation, Composition and Fate

The project found it difficult to draw clear conclusions regarding the status of hazardous management in the province. This is a result of the unreliability of key data sources, such as the Ontario Waste Generator Registry Database, and the limited scope of others, such as the National Pollutant Release Inventory (NPRI). These problems were compounded by differences in the definitions and the scope of the different reporting systems. In some cases, these lead to quantitative, and even qualitative, contradictions.

The challenges in assembling a complete picture are particularly acute with respect to on-site treatment and disposal. This fate is not captured by the provincial Waste Manifest system, which is generally regarded as the most reliable source of information, as it only deals with wastes which are transferred off-site for treatment, disposal or recycling. Significant gaps exist in the NPRI's coverage of the on-site fates of reported substances, and serious questions have been raised by the Environmental Assessment Board, Provincial Auditor and others regarding the reliability of the Waste Generator Database data.

The most recent available estimates of the total generation of hazardous wastes in Ontario, based on 1991 Waste Generator Database data, range from 1.15 to 2.5 million tonnes/yr, with up to another 1.5 million tonnes estimated to be in storage. Total generation appears to be stable or increasing slowly. In its decision regarding the OWMC, the Environmental Assessment Board accepted an estimate that hazardous waste generation in Ontario could be expected to rise at a rate of approximately 3% per year.

The chemical and allied products, primary and fabricated metals, paper and allied products, and petroleum refining sectors are generally identified as being among the leading generators of hazardous wastes in the province. Heavy metal solutions and residuals, sludges and inorganic residuals, organic solvents and sludges, landfill leachates, and waste oil are usually identified as the largest elements of the waste stream by weight.

Discharges to municipal sewer systems, followed by discharges to on-site treatment and then to surface waters, were identified by the OWMC as the leading fates of hazardous wastes disposed of on-site in Ontario. This was followed by landfilling or landfarming, other forms of treatment, incineration, and use as dust suppressants. The

NPRI data indicates that direct releases to the atmosphere, which are not reported under the provincial Generator Registry Database, are also a significant fate, particularly for organic solvents like toluene and xylenes.

Wastes transferred off-site are sent for processing, landfilling, or incineration. Wastes may also be transferred for 'recycling,' or to sewage treatment plants. In fact, the largest element of the 'subject' waste stream transferred off-site for disposal is the shipment of landfill leachate to sewage treatment plants for disposal. In some cases landfills have direct connections to municipal sewer systems for leachate disposal. The amounts of leachate dealt with in this way are not reported to the province.

Imports of hazardous wastes into Ontario have risen significantly over the past few year. This increase is reported to be related to growing imports of metals for 'recycling' from the U.S. In fact, imports of hazardous wastes from other provinces appear to be in decline, while Ontario is the leading importer of Toxic Release Inventory (TRI) substances from the U.S.. Total exports of hazardous wastes from Ontario appear to be roughly stable, although exports to other provinces are rising, while exports to U.S. are falling. There is no reported transboundary traffic in hazardous wastes from Ontario to destinations outside of Canada other than the U.S.

Virtually all of these fates of hazardous wastes generated or imported into Ontario are associated with significant environmental impacts. Discharges of hazardous wastes to municipal sewer systems, for example, interfere with sewage treatment plant operations, damage pipes and other facilities, pose occupational health and safety risks to plant staff, result in discharges of hazardous pollutants in plant effluent, and the contamination of sewage sludge with toxic substances.

The incineration of hazardous wastes, or their burning as fuel for energy recovery has been associated with emissions of a wide range of conventional and toxic pollutants. In addition, the resulting ash must itself be disposed of as a hazardous waste. Landfilling or landfarming may result in the contamination of ground or surface waters. Processing, treatment and recycling activities may result in emissions and discharges of their own, and the generation of sludges and other residuals which are themselves hazardous wastes. Recycling and off-site treatment or processing may also involve the storage of hazardous wastes for extended periods, posing risks of fire or spills. Transfers off-site also bear the risks of spills or accident during transport, and there is a history of the illegal disposal activities under the guise of 'recycling' in the province.

The composition and fate of some elements of the Ontario hazardous waste stream, such as PCB's and biomedical wastes, are relatively well documented. However, there are many others about very little information is publicly available. Recycling, for example, is the largest reported fate of NPRI substances in the province, although this does not appear to be reflected in the Ontario Waste Manifest Database, where the reported amounts of waste going to 'reclamation' (recycling) have declined significantly over the past few years. This suggests that there may be a substantial amount of hazardous waste recycling activities taking place that are not currently being reported to, or regulated by, the province.

Similarly, while discharges to municipal sewer systems were estimated by the OWMC to be the largest single fate of hazardous wastes in the province, the Ministry of the Environment was unable to provide estimates of the total amounts, composition or sources of these discharges, stating that it had no role in their monitoring. The Ministry was also unable to provide estimates of total discharges of MISA regulated substances from industrial facilities to Ontario's waterways.

Very little information is available regarding waste pesticides, particularly from the agricultural sector. With respect to waste oil, it has been estimated that the fate of 75,000,000 litres of waste lubricating oil generated in Ontario is unaccounted for each year. The on-site use of liquid industrial wastes as 'waste derived fuel' is another area where there is almost no publicly available information. All of these activities are associated with potentially significant environmental impacts

In order to address these serious gaps in the information available to the province and the public, this report has presented recommendations for the overhaul and modernization of the province's monitoring and reporting requirements regarding the generation, handling and fate of hazardous and other 'subject' wastes. These recommendations also seek to facilitate the consolidation and upwards harmonization of federal and provincial systems as much as possible to ensure the complete capture and reporting of the hazardous waste and 'subject' waste streams. The specific measures proposed to address these deficiencies in the provincial system include the following:

- the revision of the Waste Generator Registration process to establish an annual reporting requirement. Under such a structure, all generators of 'subject' wastes should be required to file annual reports with the Ministry of the Environment, on total subject waste, defined as non-product output of named substances or classes of substances, generated, its composition and its on and off-site fate. The existing provincial waste classes should be reviewed to ensure that they include all substances and classes of substances covered by the CEPA Hazardous Waste Import/Export Regulations (specifically CEPA Schedule II, Part III), National Pollutant Release Inventory, and all substances whose discharges are regulated through the MISA program. The annual reports should also include substances in storage and non-production waste generation.
- the transfer of the waste manifest system for off-site movements of 'subject' wastes to an electronic format;
- the establishment of a publicly accessible registry of pesticide container, waste oil and other sites dealing with 'subject' wastes operating under exemptions from the requirements of Regulation 347, along with requirements for regular reporting to the Ministry of the Environment regarding the quantities of materials received, stored at such sites, and their fates;
- the establishment of a requirement that facility discharge monitoring reports under

the MISA program be filed with the Ministry of the Environment in a standardized format, and the maintenance of the current frequency of discharge monitoring and reporting requirements;

- the establishment of a requirement that municipalities provide annual reports to the Ministry of the Environment regarding permitted and estimated total industrial discharges to their sewer systems;
- the establishment of a requirement that landfill operators report direct leachate discharges to municipal sewer systems to the Ministry of the Environment;
- the establishment of reporting requirements regarding pesticide sales and use by commercial applicators; and
- the publication by the Ministry of the Environment of an annual report on the management of 'subject' waste in the province of Ontario, including in discharges from MISA regulated industrial facilities, and industrial discharges to sewers. The data collected by the Ministry on the generation and fate of 'subject' wastes should also be made available to the public in a timely, comprehensive and user-friendly electronic format.

Recommendations to address significant gaps in the federal NPRI have also been presented. These have included the following:

- the expansion of the number of substances covered by the NPRI to include all substances currently reported under the United State's Toxic Release Inventory, that are in Canadian commerce;
- the establishment of reporting requirements regarding the on-site treatment and fate of substances, including on-site recycling, similar to the requirements established under the TRI through the *Pollution Prevention Act* of 1990;
- the re-establishment of mandatory reporting requirements regarding substances transferred off-site for reuse, recycling or energy 'recovery;'
- the lowering of reporting thresholds for CEPA 'Toxic' and other high priority substances, whose releases or transfers may not be captured by the NPRI due to the small amounts in which they are used, manufactured or processed. Reporting should also be triggered by releases or transfers of such substances;

- the review of reporting requirements to better capture industrial discharges to municipal sewer systems; and
- the addition of emergency planning and substance use reporting, similar to that which occurs under the TRI, on a pilot basis.

It is also recommended that steps be taken to improve public accessibility of data gathered through the CEPA Hazardous Waste Import/Export Regulations, including the possibility of no-line electronic access.

The Regulatory Framework

The regulatory framework for the management of hazardous wastes in Ontario has been largely static since the current system's establishment in 1985. Ontario was once in the forefront in this area. However, its regulatory regime is now increasingly outdated in comparison to other jurisdictions. In addition, the gaps in the available data, and underlying regulatory system have been compounded by exemptions given to the handling of specific waste streams. This has resulted in growing elements of the waste stream about which the Ministry of the Environment and, consequently, the public, knows little or nothing.

These arrangements have included formal exemptions from the requirements of Part V of the *Environmental Protection Act* and Regulation 347, for such activities as the 'recycling' of hazardous and liquid industrial wastes, the on-site use of liquid industrial wastes as 'waste derived fuel,' the operation of collection depots for the collection of waste oil and related products, and empty pesticide containers, and the operation of refrigerant waste recycling and disposal sites.

In some cases, such as waste oil and pesticide collection depots and refrigerant recycling and disposal sites, operating standards apply as a condition of the exemption from the general requirements of Regulation 347. However, these standards are often vague, and insufficiently specific to be enforceable. In some cases, operators are not even required to report the location of their facilities to the Ministry, and none are required to report regularly to the Ministry on the amounts of waste received, in storage, or its fate.

In addition, the Ministry has granted a series of 'administrative' exemptions from the 'subject' waste requirements of Part V of the *Environmental Protection Act* and Regulation 347 whose statutory basis is open to serious question. These include an 'exemption' granted for activities related to the recycling of lead-acid batteries, and an agreement with Domtar Ltd. to permit the use of 'black liquor' from its Trenton pulp and paper mill as a dust suppressant under the trade name 'Dombind.' Significant environmental concerns have been identified in relation to these activities.

More widely, the province lacks modern emission and operating standards for hazardous and liquid industrial waste incinerators, biomedical waste incinerators, facilities using 'subject' waste as fuel, or the direct release of hazardous substances to the atmosphere. No enforceable provincial standards exist at all for industrial discharges to municipal sewers systems, and no action has been

taken to address a longstanding need for the imposition of restrictions on the land disposal of hazardous wastes. In addition, the existing requirements of the *Pesticides Act* regarding the disposal of pesticide containers are widely recognized as being out of date, and no standards exist at all regarding the disposal of waste pesticides by agricultural users.

At the federal level, the government of Canada has yet to ratify and implement amendments to the *Basel Convention on the Transboundary Movement of Hazardous Wastes* obligations regarding barring the export of hazardous wastes from Canada to developing countries for recycling or final disposal. Canada has also failed to implement provisions of the Convention that waste exporters be required to plan to reduce their need for exports of hazardous wastes for final disposal. In the fall of 1997, the Auditor-General of Canada raised serious questions about Canada's ability to fulfil its international commitments regarding the transboundary movement of hazardous wastes. Finally, provisions of the federal *Pest Control Products Act* regulations permit the continued sale and use of existing stocks in Canada of pesticides whose registration under the Act has been withdrawn.

These gaps in the regulatory framework at the federal and provincial levels have been compounded by the dramatic reductions in the resources available to the Ministry of the Environment and Environment Canada over the past three years. In the case of the Ministry of the Environment, the Ministry's operating budget has declined by approximately 44% between the 1994-95 and 1997-98 fiscal years. Specifically with respect to waste management, as of December 1996 it was reported that staffing levels had been reduced by more than 30%, measured against the 1994-95 fiscal year. There has also been a marked decline in the number of environmental prosecutions initiated by the Ministry over the past two years.

The situation with respect to the completeness of the available data and the underlying regulatory framework is likely to be compounded by proposals for the reform of Regulation 347 presented by the Ministry of the Environment in July 1996, and re-iterated by the Ministry in November 1997. These included proposals of significant expansion of the exemption from the requirements of Regulation 347 related to the 'recycling' of hazardous and liquid industrial wastes.

In addition, the use of 'standardized' approvals,' along the lines of the existing conditional exemptions for waste oil and pesticide collection depots and refrigerant recycling and disposal sites, would be expanded to include such activities as the on-site storage of hazardous wastes and the operation of hazardous waste transfer stations. Such activities currently require the granting of a Certificate of Approval by the Ministry. The Ministry of the Environment also proposed to remove 'liquid industrial wastes' and 'registerable solid wastes' from the definition of 'subject' waste.

The Ministry proposals were presented as being intended to reduce costs to industry, and to promote the 'recycling' and other forms of diversion of hazardous wastes from disposal. The Ministry has also been offering regulatory concessions to specific sectors or even individual firms, in exchange for voluntary commitments to reduce emissions of pollutants.

This proposed approach entails significant risks to the environment, human health and public safety. This is especially apparent in light of the July 1997 Plastimet Inc. fire and the subsequent report of the Office of the Fire Marshal recommending that environmental and fire safety standards for

recycling and waste handling facilities be significantly strengthened. The Ministry's proposals would also compound the existing gaps in the available data regarding the management of hazardous and other 'subject' wastes in the province. Consequently, with the exception of some proposed measures to harmonize the Ontario definition of hazardous waste upwards with existing federal requirements, they should not proceed.

Rather, a new approach is needed. This must address the information and regulatory gaps in the existing system, and place an increased emphasis on waste reduction and pollution prevention at source. Although significant gaps exist in the available data, sufficient information has been generated through the OWMC Environmental Assessment process and other sources to indicate that there are substantial weaknesses in the current regulatory framework which require immediate attention.

The following measures have been proposed in this report to address these gaps:

- the strengthening of the regulatory oversight of hazardous and liquid industrial waste 'recycling' activities. Specifically, the existing exemption for such activities from the requirements of Part V of the *Environmental Protection Act* (EPA) and Regulation 347 should be reviewed and consideration given to its withdrawal;
- the review of the requirements for 'selected' waste depots exempted from the requirements of Part V of the EPA and Regulation 347 to ensure the adequacy and enforceability of the applicable standards, particularly with respect to site registration, reporting, staff training, spill and fire prevention and protection and public accountability. There may be a potential role for a modified approval process which falls between the full Certificate of Approval requirements, and total exemptions, for routine, and low risk activities such as the collection of household hazardous wastes from the public. However, adequate oversight, enforcement and accountability structures are required for such a process, along with an open, public process to determine its appropriate application are needed;
- the termination of the practice of granting extra-legal exemptions from the requirements of Part V of the EPA and Regulation 347 for such activities as lead-acid battery recycling, and withdrawal of the existing 'exemptions;'
- the development and implementation of stringent emission and operating standards for biomedical and hazardous waste incinerators, and facilities using 'subject' waste as fuel;
- the development and implementation of pre-treatment standards for industrial discharges to sewers and the establishment of pre-treatment requirements for landfill leachate discharges or transfers to municipal sewage treatment plants;
- the implementation of restrictions on the land disposal of hazardous wastes;
- the prohibition of the use of 'subject' wastes as dust suppressants;

- the prohibition of the use of waste oil as fuel in small space heating furnaces;
- the adoption of a modernized definition of biomedical wastes; and
- the adoption of requirements regarding the recycling or reuse of empty pesticide containers, and regarding the disposal of waste pesticides.

At the federal level, steps need to be taken to implement Canada's obligations under the Basel Convention regarding the ban of exports of hazardous wastes to developing countries for recycling or final disposal, and with respect to adoption of planning requirements for Canadian exporters of hazardous waste to reduce their need for exports for the final disposal. Amendments are also required to the *Pest Control Products Act* to prevent the use or sale of de-registered pesticides.

In the longer term, there is a need at the federal and provincial levels to consider a shift from regulation of hazardous 'wastes' to regulation of hazardous 'materials.' Such an approach has the advantage of avoiding the debates about whether hazardous 'recyclable' materials should be removed from the definition of hazardous wastes. It would also have the advantage of capturing the use and handling of hazardous substances, activities which may pose many of the same environmental and health problems as the handling of hazardous wastes.

Waste Reduction and Pollution Prevention

The environmental impacts associated with virtually all of the fates of hazardous wastes, once they have been generated, stress the need for the province's policy and regulatory framework for the management of such wastes to emphasize their reduction at source, through pollution prevention measures.

Currently, the province of Ontario is relying almost entirely on voluntary action by industry to reduce the generation of hazardous wastes. The promotion of such action has been presented as a major element of the province's rationale for its proposals to weaken the regulatory framework for the management of 'subject' wastes, and to reduce the monitoring and reporting requirements applicable to industry.

In addition to posing significant risks to public safety and environmental quality, this approach is at odds with that being taken by other jurisdictions in Canada and the United States. Most Canadian provinces have implemented, or are moving towards the adoption of, producer responsibility requirements regarding the management of waste oil and other household hazardous wastes. These arrangements require industry to internalize the post-consumer management costs of their products.

More broadly, the U.S. federal government and many states have adopted legislation to link reporting activities under the Toxic Release Inventory to requirements that waste generating facilities undertake pollution prevention planning programs. The 'materials accounting' model employed in legislation adopted in Massachusetts and New Jersey, for example, has resulted in significant

reductions in the use of toxic chemicals and the generation of hazardous wastes, as well as substantial cost savings to the affected industries.

The current pollution prevention planning program sponsored by the province is of a voluntary nature, and its reach has been extremely limited. Consequently, it is recommended that legislation similar to the Massachusetts statute be adopted in Ontario in conjunction with the proposed revisions to the province's 'subject' waste monitoring and reporting system. This measure should be supported by increased provincial investments in the development and diffusion of pollution prevention skills and technologies, particularly with respect to hazardous waste reduction.

A number of U.S. states, and many jurisdictions in Western Europe have also applied substantial charges or taxes to the generation of hazardous wastes. These are intended to provide incentives for waste reduction and, in some cases, provide revenues for the operation of hazardous waste programs. The Ministry of the Environment has proposed the application of a similar charge, for cost recovery, purposes to waste generators in Ontario.

The application of such a charge should be strongly supported in principle. However, serious concerns must be raised about the long-term implications of the core regulatory functions of the Ministry of the Environment becoming dependent for resources upon the very activities which they are intended to oversee. These are basic governmental responsibilities related to the protection of public goods, and should be supported through general government revenues.

In light of this concern, it is recommended that the revenues realized through the application of a hazardous waste charge in Ontario be employed to support 'capital' cost activities related to the management of these wastes. This could include such things as the remediation of 'orphan' contaminated sites, maintenance of spills and other emergency response capacity, pollution prevention planning programs, and hazardous waste reduction technology and skills development and diffusion. The revenues released through the support of these programs through the application of a hazardous waste charge should be reallocated to the basic regulatory functions of the Ministry related to hazardous and other 'subject' wastes, such as approvals, monitoring, enforcement, and public reporting.

Treatment and Disposal Capacity

In its 1994 decision regarding the Ontario Waste Management Corporation, the Environmental Assessment Board identified a substantial need for additional hazardous waste treatment and disposal capacity in Ontario. The Board highlighted the absence of a treater of last resort in the province, and the increasing dominance of the off-site treatment and disposal services sector by a very small number of firms. These problems continue to exist. The province also remains vulnerable to border closings with respect to exports of wastes for which treatment and disposal capacity does not exist in Ontario, such as biomedical wastes requiring incineration.

In addition, no method of disposal exists for some elements of the hazardous waste stream. CFC's are a particularly significant problem in this regard. The Ministry of the Environment has

estimated that their phase-out will eventually require the treatment of 40,000 tonnes of these chemicals.

Given the potential environmental and human health impacts of hazardous waste treatment and disposal facilities, it is critical that adequate reviews of proposed facilities occur before they are established. It is also important that new disposal capacity not be approved in isolation from an overall provincial strategy to reduce the generation of hazardous wastes. The availability of low cost disposal facilities may undermine both the use of more environmentally sound disposal options, and efforts to encourage hazardous waste reduction through the application of pollution prevention skills and technologies.

Within this context, serious concerns must be raised about the Ministry of the Environment's recent approvals of a major expansion of the Laidlaw Environmental Service's hazardous waste landfill in Sarnia, and of the use of a scrap metal smelting furnace as a permanent low-level PCB disposal facility, operated by Gary Steacy Dismantling Ltd., in Northumberland County. The approval of the Laidlaw facility expansion occurred without a public hearing before the Environmental Assessment Board.

In its decision regarding the PCB destruction facility, the Board raises serious questions about why the proposal had not been designated for review under the *Environmental Assessment Act*, particularly given its implications for the use of commercially available, mobile, non-incineration PCB destruction technologies in the province. The Board also noted the absence of public interest intervenors able to challenge evidence brought forward by the proponent in the hearing regarding the likely environmental and health impacts of the facility.

These events highlight both the impact of the expiry of the *Intervenor Funding Project Act* in April 1996, and the erosion of public hearing requirements related to the approval of hazardous waste handling, treatment and disposal facilities over the past few years. These developments have significantly weakened the level of external oversight and accountability related to such approvals.

As a result, it is recommended that all future proposals for permanent hazardous and other 'subject' waste disposal facilities be designated for review under the *Environmental Assessment Act*. In addition, it is recommended that the requirements for mandatory public hearings before the Environmental Assessment Board under the *Environmental Protection Act*, prior to the approval of hazardous waste handling or disposal systems or sites, be restored. Consideration must also be given to the provision of some form of intervenor funding to *bona fide* public interest intervenors in such hearings.

Accountability

The Ministry of the Environment proposed wide ranging alterations to the regulatory framework for the management of hazardous wastes in the province in July 1996, and indicated its intention to proceed with these changes in November 1997, under the auspices of its regulatory review process. These proposals were presented with little or no supporting documentation or evidence regarding the need for change, or the likely impact of the proposed changes on public safety and environmental

protection.

These developments, and the recent approvals of new permanent hazardous waste disposal facilities in the province, highlight the need for enhanced accountability structures regarding the Ministry's activities in this area. This requirement is particularly acute in light of the elimination of most of the Ministry of the Environment's external advisory committees over the past two years.

It is essential that the public have timely access to the information necessary to assess the consequences of public policy decisions and regulatory changes made by the government. The presentation of annual reports on the generation, handling and fate of 'subject' wastes in the province by the Ministry would be an important step towards meeting this need. More broadly, data and information on the management of hazardous and other 'subject' wastes should be made available to the public in a timely, comprehensive and user friendly manner. In addition, the practice of providing annual reports regarding environmental law enforcement activities by the Ministry, terminated in 1995, should be restored.

The establishment of an external, multi-stakeholder advisory committee regarding hazardous waste management would also be an important step towards enhancing the accountability of the Ministry for its actions and policies. Such a body could provide independent advice, and review Ministry proposals on such issues as the addition or deletion of substances to the definition of 'subject' wastes, and the design and appropriate application of a 'standardized' approval system.

In the longer term, a number of broader steps could be taken to both improve the environmental accountability of the government and strengthen the information base available for public policy decision-making. These might include the establishment of a formal state of the environment reporting function for the Office of the Environmental Commissioner. Such an arrangement would help to ensure the independence and objectivity of such reporting activities.

Conclusions

This report has identified significant gaps in the available information, and underlying regulatory framework for the protection of public safety, public health and the environment, regarding generation, handling and fate of hazardous wastes in Ontario. Recent proposals for changes to the regulatory framework made by the provincial government seem likely to widen, rather than narrow these gaps. In some cases, their implementation could pose significant risks to public safety and environmental quality.

The findings of this study indicate that the province's reporting and regulatory regime for hazardous wastes requires a thorough overhaul and modernization. This is necessary to provide an adequate information base for public policy decision-making, ensure the accountability of industry and government, protect the public's safety, health and environment, and promote pollution prevention and hazardous waste reduction. The changes that have been proposed will require several years to implement, and necessitate substantial investments of resources. However, these measures are necessary to ensure a safe and environmentally sustainable future for present and future generations

of Ontarians.

LIST of ACRONYMS

AMRC	Association of Municipal Recycling Coordinators
AOX	absorbable oxygen halides
ARET	Accelerated Reduction / Elimination of Toxics
ASWMC	Alberta Special Waste Management Corporation
BATEA	Best Available Technology Economically Achievable
CCME	Canadian Council of Ministers of the Environment
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (U.S.)
CFC	chlorofluorocarbon
CIELAP	Canadian Institute for Environmental Law and Policy
CPI	Crop Protection Institute
DDT	dichloro-diphenyl-trichloroethane
EPA	Environmental Protection Agency (U.S.)
EPCRA	Emergency Planning and Community Right to Know Act
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
HHW	Household Hazardous Waste
HWTG	Hazardous Waste Task Group
IC&I	Industrial, Commercial and Institutional
ICRC	International Cancer Research Centre
MACT	Maximum Achievable Control Technology
MISA	Municipal Industrial Strategy for Abatement
MOEE	Ministry of Environment and Energy (also MoEE and OMEE)
NPRI	National Pollutant Release Inventory
OECD	Organization for Economic Cooperation and Development
OWMC	Ontario Waste Management Corporation
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenols
PCP	pentachlorophenol
PCPA	Pest Control Product Act
RBRC	Rechargeable Battery Recycling Corporation
RCRA	Resource Conservation and Recovery Act (U.S.)
SARA	Superfund Amendment and Reauthorization Act (U.S.)
STP	Sewage Treatment Plant
TCDD	tetrachloride-benzo-p-dioxins
TRI	Toxics Release Inventory (U.S.)
WDF	Waste Derived Fuel
WPCP	Water Pollution Control Treatment Plant

APPENDIX A: CONSOLIDATED RECOMMENDATIONS

V. INDUSTRIAL, INSTITUTIONAL AND COMMERCIAL

IV-1. Waste Generator Registry Reform.

Waste generators should be required to provide an annual report of non-product output of designated substances or classes of substances prior to handling, transfer, treatment or release. The current Regulation 347 waste classes should be reviewed to ensure that they include the substances and classes of substances covered by the CEPA Hazardous Waste Import/Export Regulations (listed in Schedule II, Part III of CEPA), the NPRI, and all substances whose discharges are regulated through the MISA program. The reporting structure should seek to identify and report on the presence of specific substances within waste classes.

The fate of these non-product outputs should also be required to be reported. This would include releases to the air, water or land, underground injection and on or off-site treatment, processing, out of process recycling or reuse, incineration, use as fuel, or disposal through landfilling or other means. Annual filings should also include substances in, or sent to, storage on or off-site, and non-production related waste generation (waste that is generated as a result of one-time events, including accidental spills, facility closures and contaminated site remediation).

These filings should be made available to the public, and their contents presented by the Ministry of the Environment in a summary report on an annual basis.

IV-2. Selected Waste Depots and Other Exempted Facilities

The Ministry of Environment should establish a public registry of selected waste depots and other facilities operating under exemptions from the general generator registration requirements of Regulation 347. Such facilities should be required to file regular reports with the Ministry regarding quantities and types of wastes collected, and their fates, including storage. These reports should be made available to the public through the registry, and the contents of the reports from each type of facility presented in summary form each year.

IV-3. Waste Manifesting

Non-product output and non-production related wastes falling with the definition of 'subject' waste sent-off site for disposal, treatment, storage, export, reuse, recycling or use as fuel should be subject to the waste manifesting requirements of Regulation 347. Residues from industrial, manufacturing or commercial 'recycling,' reuse or recovery operations should also be included under these requirements.

The Ministry of the Environment should move towards the transfer of the waste manifesting and tracking process to an electronic format. This would reduce the paperwork associated with waste movements, and potentially permit the monitoring of waste movements in real time.

IV-4. Adding or Deleting Substances or Classes of Substances to or from the 'Subject' Waste Definition.

A formal procedure for dealing with proposals to add or delete substances or classes of substances from the definition of 'subject' waste should be established by the Ministry of the Environment. A multi-stakeholder advisory committee should be created to review and provide the Ministry with advice on listing and de-listing decisions. Submissions to the advisory committee, and its conclusions and recommendations to the Ministry should be a matter of public record.

IV-5. National Pollutant Release Inventory

Reporting requirements should be established for all TRI substances in Canadian Commerce (i.e. on the CEPA Domestic Substances List), which are not currently subject to NPRI reporting.

The re-establishment of mandatory reporting requirements for substances sent off-site for reuse, recycling or energy recovery for the 1998 reporting year should proceed.

The reporting thresholds for CEPA 'Toxic' substances and known and suspected carcinogens should be lowered to ensure more comprehensive reporting on releases and transfers of these substances. Consideration should be given to triggering reporting requirements on the basis of amounts of these substances generated and released or transferred rather than on the amounts used in a facility.

The establishment of reporting requirements regarding the on-site treatment of NPRI substances including quantities reused, recycled or recovered (i.e. waste derived fuel) should proceed as soon as possible.

The exemptions from NPRI reporting requirements should be revised to ensure coverage of all sectors which are currently required to report under the TRI.

The establishment of a pilot program for reporting on facility use of NPRI substances should be considered.

The establishment of a pilot program for the reporting of emergency planning activities and plans under the NPRI, similar to that which occurs under the TRI, should be considered.

IV-6.

The province should proceed with development and implementation of pre-treatment standards for industrial discharges to sewers as proposed under the MISA program as soon as possible.

IV-7.

In the interim, the Model Sewer-Use By-Law should be revised to include standards for persistent organic pollutants, strengthened standards regarding heavy metals, and to end the practice permitting of sewer-use agreements.

IV-8.

Municipalities should be required to file Annual Reports to with the Ministry of the Environment regarding permitted and estimated total industrial discharges to their sewer systems. These reports and an annual summary of their contents should be made available to the public by the Ministry.

IV-9.

The NPRI reporting requirements should be revised to ensure the more effective reporting of industrial discharges to sewers. As a first step in this regard, municipal governments should be asked to provide the NPRI with estimates of industrial discharges to their sewer systems on a voluntary basis.

IV-10.

The Ministry of the Environment should amend Regulation 347 to require the pre-treatment of landfill leachate prior to its transfer or indirect discharge through sanitary sewer systems to sewage treatment plants for disposal.

IV-11.

The Ministry of Environment should require landfill operators to report to the Ministry direct leachate discharges to municipal sewer systems. The contents of these reports should be made available to the public.

IV-12.

Reporting under the MISA monitoring requirements for industrial dischargers should be moved to a standardized electronic format, prescribed by the Ministry of the Environment, as soon as possible.

IV-13.

The current frequency of monitoring requirements should be maintained. Effluent limits and reporting requirements for MISA substances designated in regulations should be maintained, except where

it can be demonstrated that a substance is not used, produced, generated as a non-product output, or stored by a facility. If use, production, generation as a non-product output, or storage resumes then effluent limits and reporting requirements should be resumed.

IV-14.

The Ministry should provide the public with annual reports on discharges to surface waters from industrial and municipal sources regulated under the MISA program, including total amounts of MISA substances, totals by sector, leading substances by sector, totals by receiving water body, and leading facilities by sector. Discharge monitoring data should also be made available to the public in a user-friendly electronic format.

IV-15.

The Ministry should consider the application of an administrative fee to dischargers regulated under the MISA program to cover the costs of handling and processing of discharge monitoring data.

IV-16.

The Ministry of the Environment should proceed with the implementation of restrictions on the land disposal of hazardous wastes as soon as possible.

IV-17.

The Ministry of the Environment should proceed with its intention to revoke Regulation 348, authorizing certain public landfills to receive hauled liquid industrial wastes.

IV-18.

The Ministry of the Environment should develop and implement stringent emission standards for on-site and off-site commercial hazardous waste and liquid industrial waste incinerators and the on- or off-site use of 'subject' waste as 'waste derived fuel.'

IV-19.

The current exemption for 'recycling' of 'subject' wastes from requirements of Part V of the Environmental Protection Act and Regulation 347 should be withdrawn. Recycling sites and related transfer stations and other facilities should be subject to requirements to obtain Certificates of Approval, manifest movements of materials to and from sites, including movements of residuals, and the proposed revised waste generator reporting regime regarding on-site disposal, release or transfer of residues from their operations.

IV-20.

The Ministry of the Environment should develop a policy and guidelines for the approval and operation of 'subject' waste recycling sites and facilities. These specifically should address:

°training and certification of operators and staff, with requirements for regular re-certification. Training requirements should focus on regulatory requirements, occupational health and safety, and fire and spills protection and response;

°limits on quantities which may be stored on-site at any given time and requirements regarding storage practices;

°requirements for planning and the necessary equipment to respond to spills and other emergencies;

°requirements regarding facility location, including prohibitions on the location of sites in close proximity to schools, hospitals, correctional facilities, high density residential areas and similar sensitive sites;

°the adoption of a policy that a Certificate of Approval not be granted unless there is confirmation from the local fire department that the facility is in compliance with fire safety requirements, including appropriate security measures, an approved fire safety plan, floor and site plans, an inventory of materials, and personnel adequately trained in the fire safety plan and emergency procedures; and

°Facilities should be required to provide regular reports to the Ministry of the Environment regarding the amounts of materials stored on-site. These reports should be available to the public.

IV-21.

Sites approved to 'recycle' subject wastes should be listed in the public registry proposed in Recommendation IV-4.

IV-22.

The Ministry of the Environment should develop a policy and guidelines regarding the approval of 'subject' waste processing sites and operations similar to those proposed in recommendation IV-20 for 'recycling' sites and operations.

IV-23.

The Ministry of the Environment should not approve further on- or off-site uses of 'subject' wastes as dust suppressants. Existing uses should be phased out as soon as possible.

IV-24.

The public notice and public reporting requirements re: CEPA Waste Import/Export Regulations should be revised. Consideration should be given to posting waste import/export notices on an electronic registry, and making waste import/export data available to the public in a timely and user-friendly electronic format.

IV-25.

The federal government should ratify the amendments to the Basel Convention banning the export of hazardous wastes for disposal or recycling to developing countries through amendments to CEPA Waste Import/Export Regulations as soon as possible.

IV-26.

The federal government should proceed with the proposed amendments to CEPA to require that exporters of hazardous wastes from Canada have plans for reducing/phasing out the quantity of waste that is being exported for final disposal.

IV-27.

Environment Canada and other affected agencies should proceed with the implementation of the recommendations of the Auditor-General of Canada regarding the administration and enforcement of the CEPA Hazardous Waste Import/Export Regulations as soon as possible.

IV-28.

The current spills reporting requirements should be retained. In addition, the Ministry should adopt a policy and guideline regarding spills management planning and training. Compliance with the guideline should be a condition of the granting of new or amended Certificates of Approval for facilities or systems which generate or handle 'subject' wastes. These requirements should be phased in for existing facilities or systems as soon possible.

IV-29.

Ontario should enact a Pollution Prevention Planning Act. This should be based on the on Massachusetts and New Jersey models of materials accounting and planning, and integrated with the revised waste generator registration and reporting requirements.

VI-30.

A pollution prevention planning and research centre, based on the model of the Massachusetts Toxics Use Reduction Institute, should be established to facilitate the implementation of the Pollution Prevention Planning Act. Its functions should include training, the provision of technical assistance, and program evaluation.

IV-31.

Ministry of the Environment should implement a charge on the generation of 'subject' wastes on a per tonne basis. This should:

°cover the total amount of 'subject' waste generated by a site regardless of whether it is disposed, treated, recycled, or stored on or off that site. There should be no cap on the total charge for large waste generators; and

°seek to recover costs of administration of the pollution prevention planning program outlined in Recommendations IV-29 and IV-30, the revitalization and delivery of other pollution prevention/hazardous waste reduction technology and skills development and diffusion programs provided by the province, 'orphan' contaminated site remediation, spills response and remediation, and the capital costs of transferring the waste manifest system to an electronic format as proposed in Recommendation IV-3.

IV-32.

The resources released through the financing of the activities outlined in Recommendation IV-31 through the application of a hazardous waste charge should be employed to strengthen staffing levels with the Ministry related to hazardous and 'subject' waste management, particularly in the areas of standards development, monitoring, enforcement and reporting.

IV-33.

Consideration should be given to varying charge on basis of nature of waste generated to provide incentives to reduce the generation of high priority waste substances and streams such CEPA "Toxic" and substance identified in the Canada-Ontario Agreement on the Great Lakes Ecosystem Basin Agreement and Canada-U.S. Great Lakes Binational Toxics Strategy.

IV-34.

The Ministry of the Environment should terminate its charges for public access to Waste Generator Database and Waste Manifest Database Data.

IV-35.

Regulation 347 should be amended to eliminate the exemption from public hearings prior to approval of new or expanded on or off-site subject waste disposal facilities other than incineration or landfilling. The approval of all new or expanded disposal facilities should be subject to public hearing requirements. The automatic waiving of the public hearing requirements under the Environmental Protection Act for disposal facilities designated under the Environmental Assessment Act, for which no hearings are required under that Act, should also be withdrawn.

IV-36.

The Ministry of the Environment should adopt a regulation under Environmental Assessment Act requiring the environmental assessment of new or expanded commercial disposal facilities for 'subject' waste.

V.POLYCHLORINATED BIPHENOLS (PCBs)

V-1.

The Ministry of the Environment should adopt a policy regarding the export of PCB's for destruction. This policy should be based on the principle that exports of Ontario PCB's for disposal at facilities which would not meet Ontario standards regarding transportation, handling, storage and destruction technology not be approved.

V-2.

A regulation should be adopted under the Environmental Assessment Act, designating all new commercial PCB incineration facilities for review under the Act.

V-3.

Public hearing requirements should continue to apply for all first uses of non-incineration PCB destruction technologies. Where a first use is approved, public hearings regarding subsequent uses should be at the discretion of the Ministry, with hearings being required if requested by residents or the municipal council of the proposed host community.

V-4.

A certification of approval should be required for the establishment of on-site PCB storage sites, and PCB consolidation and transfer sites. A guideline for site consolidation activities should be developed to facilitate the approval of such activities.

V-5.

The Ministry of the Environment should provide a clear scientific rationale for the proposed removal of mono and dichloride PCB's from the Ontario definition of PCB's prior to proceeding with this proposal. More generally, the Ministry should establish a clear process for dealing with proposals to remove categories of PCB's or other 'subject' wastes from the current Ontario definitions, as proposed in Recommendation IV-4.

VI. WASTE PESTICIDES

VI-1.

Regulation 914 should be amended to require that commercial pesticide applicators file annual reports with the Ministry of Environment regarding the identity (PCPA Registration Number) and quantity pesticides used each year, and the purposes for which the pesticides were applied.

VI-2.

Regulation 914 should be amended to require that commercial pesticide vendors, including agricultural supply vendors, file annual reports with the Ministry of Environment regarding the quantity and identity of pesticides sold each year.

VI-3.

The Ministries of Agriculture, Food and Rural Affairs, and of the Environment, Environment Canada and Health Canada's Pest Management Regulatory Agency should conduct a "Clean Sweep" program to collect waste, expired or de-registered agricultural pesticides as soon as possible, as per Canada's commitments under the April 1997 Canada-U.S. Binational Virtual Elimination Strategy for Persistent Toxic Substances.

VI-4.

The general exemptions for the handling and disposal of waste agricultural pesticides from the requirements of Regulation 347 should be removed. Exemptions may be provided for the delivery of waste pesticides to "clean sweep" or subsequent program collection points.

VI-5.

The establishment of waste pesticide collection depots should continue to require a Certificate of Approval under the Environmental Protection Act. The Ministry should move forward with the development of guidelines for the approval and operation of such facilities to expedite their establishment as soon as possible. The following requirements should apply to waste pesticide collection depots:

°specific, enforceable provisions for the training and certification of depot operators and staff should be established, with requirements for regular re-certification. These requirements should emphasize regulatory requirements, fire and spill prevention and response, and occupational health and safety;

°limits on quantities which may be stored on-site at any given time and requirements regarding storage practices;

°requirements for planning and the necessary equipment to respond to spills and other emergencies;

°requirements regarding facilities location, including prohibitions on the location of sites in close proximity to schools, hospitals, corrections facilities, high density residential areas and similar sensitive sites;

°prior to the issuing of a certificate of approval, the Ministry of Environment should seek and obtain confirmation from the local fire department that the facility is in compliance with fire safety requirements, including appropriate security measures, an approved fire safety plan, floor and site plans, an inventory of materials, and personnel adequately trained in the fire safety plan and emergency procedures;

°depot operators should be required to file monthly reports with the Ministry of Environment regarding the quantities, types and fates of pesticides collected and in storage at the site. These reports should be made available to the public; and

°pesticides collected at waste pesticide collection depots should be required to be destroyed at an approved facility.

VI-6.

The specific locations of approved pesticide collection depots and the identities of their owners and operators should be listed in the publicly accessible registry of sites proposed in Recommendation IV-2.

VI-7.

The government of Ontario should impose of a 1% waste pesticide handling charge on the sale of all pesticides in the province of Ontario. The revenues from this charge should be dedicated to support the operation of waste pesticide collection depots, including the training of staff, handling and disposal costs, educational programs for generators, and research on the generation and disposal of waste pesticides. Certified agriculturalists, as defined by the Pesticides Act, and members of the general public should be permitted to deposit waste pesticides at such facilities free of charge.

VI-8.

The Pest Control Products Act should be amended to prohibit the sale, export or use of pesticides whose registration under the Act has been cancelled. A similar provision should be added to the Ontario Pesticides Act for pesticides whose classification under the Act is withdrawn. The

cancellation of the registration of such pesticides should be accompanied by a requirement that existing stocks be delivered to waste pesticide collection depots for destruction. The export of de-registered pesticides to jurisdictions where the use of such pesticides is permitted should be specifically prohibited.

VI-9.

Existing requirements for the exemption of pesticide container collection depots from the requirement to obtain a Certificate of Approval should be revised to strengthen the requirements regarding staff training, storage limits, and fire protection. In particular:

°specific provisions for the training and certification of operators and staff should be established, particularly with respect to regulatory requirements, fire prevention and response, and occupational health and safety, with requirements for regular re-certification;

°limits on the quantities of containers which may be stored on-site at any given time, and requirements regarding storage practices, should be established;

°a requirement should be established that notice be given to the Ministry of Environment of intent to establish a collection depot prior to the commencement of operations, including the specific location and the identify of the owner and operator. The notice should be posted on the Environmental Bill of Rights Environmental Registry for public comment for a period of not less than 30 days. Operations should not be permitted to commence until the notice of intent is acknowledged by the Ministry. The Ministry should have the option of declining to permit the commencement of operations or of imposing specific additional conditions on individual facilities;

°the Ministry should not acknowledge a notice of intent unless it includes a confirmation from the local fire department that the facility is in compliance with fire safety requirements; and

°pesticide container collection depots operators should be required to file quarterly reports with the Ministry of Environment and Energy regarding the quantities, types and fates of containers collected and the types of pesticides they contained. These reports should be made available to the public, along with an annual summary report on depot operations across the province.

VI-10. *The specific locations of pesticide container collection facilities and the identities of their owners and operators should be provided in the public registry of sites proposed in Recommendation IV-2.*

VI-11. *Regulation 914 should be amended to require the reuse or recycling of empty pesticide containers. Consideration should be give to the establishment of a deposit-refund requirements on pesticide containers to ensure their return to vendors.*

VII. BIOMEDICAL WASTES

VII-1.

The province should proceed with the adoption of a new definition of "biomedical waste" and the specification of treatment requirements in Regulation 347.

VII-2.

Proposed definition of "biomedical waste" should be expanded to include other wastes which come into contact with a human or animal potentially infected with one of a specified list of agents, other potentially infectious or pathogenic agents, or cytotoxic (drug) waste.

VII-3.

Province should document and make available to the public its scientific and technological justifications, from the perspectives of environmental protection and public health and safety for its proposals for permitting the:

°sewering of waste whole blood; and

°the disposal of "treated biomedical wastes" in sanitary landfills

no later than the time that the proposed new definition of biomedical wastes is posted on the EBR registry for public comment as a proposed amendment to Regulation 347.

VII-4.

Veterinarians, health professionals, mortuaries and funeral establishments, mobile health care, nursing homes, and independent health facilities should be required to provide quarterly reports on the quantities, composition and fate of "biomedical wastes" generated at their facilities under the new "biomedical waste" provisions of Regulation 347. Small quantity generators should be required to file annual reports.

VII-5.

"Treated biomedical waste" should remain subject to the existing waste generator and manifesting requirements, and disposal site approval requirements, for "pathological wastes" under Regulation 347 until such time as a new definition of "biomedical waste" is incorporated into the regulation

VII-6.

The Ministry of Environment and Energy should move towards the adoption of a regulation to control

emissions from facilities incinerating biomedical wastes, including hospitals, as soon as possible.

VII-7.

The province should continue to seek the development of facilities within Ontario for the handling of Ontario biomedical wastes requiring incineration.

VIII.WASTE OIL

VIII-1.

Province should move forward with establishment of take-back system for oil retailers through regulation. The take-back requirement should apply to all retail locations selling more than 500 litres/yr of oil or other lubricants. Locations selling less than 500 litres/yr should be required to enter into arrangement to deal with the designated wastes. The program should include waste oil and grease, transmission and hydraulic fluids, anti-freeze, oil filters, and oil and fluid containers.

VIII-2.

Used oil, oil filters, and anti-freeze collected through the depot system should be required to be re-refined, except where this is impossible due to contamination.

VIII.3.

A deposit, refundable upon return to the retailer, on oil, transmission and hydraulic fluid, and anti-freeze containers and oil filters should be applied to ensure their return to a collection depot.

VIII-4.

The recycling of lubricants, oil filters, anti-freeze and containers collected through this program should be financed through the application of a charge at the point of sale for these products.

VIII-5.

The imposition of 1 cent per litre waste oil handling tax to deal with contaminated waste oils which cannot be recycled should be considered. Revenues from such a tax should be placed in a dedicated fund for this purpose.

VIII-6.

All facilities burning waste oil generated on or off-site as waste derived fuel should be required to meet the emission requirements established through Ministry of Environment and Energy Guideline 7-A (Combustion and Air Pollution Control Requirements for New Municipal Waste Incinerators), pending the development of specific requirements for such facilities.

VIII-7.

The Ministry of the Environment should move to end the practice of burning waste oil in small space heating furnaces. No new burners should be approved by the Ministry, and a schedule should be established for the phase-out of existing burners.

VIII-8.

A regulatory prohibition on the disposal of waste oil, and transmission and hydraulic fluids into surface waters, and sanitary and combined sewers should be adopted under the Ontario Water Resources Act. In the interim, Ministry of Environment's the Model Sewer-Use By-Law should be amended to explicitly bar the disposal of waste oil, and transmission and hydraulic fluids into sanitary or storm sewers.

VIII-9.

A similar prohibition should be adopted under the Environmental Protection Act regarding the disposal of waste oil, oil filters, hydraulic and transmission fluids in landfill or surface applications to land.

VIII-10.

Waste oil recycling activities should continue to be subject to waste approvals, generator registration and waste manifesting requirements.

VIII-11.

"Liquid Industrial Wastes" should continue to be defined as subject wastes for the purposes of Regulation 347.

VIII-12.

The existing requirements for the exemption of waste oil collection depots from the requirement to obtain a Certificate of Approval should be reviewed with emphasis on staff training, storage limits, and fire and spills prevention and response. In particular:

°specific provisions for the training and certification of operators and staff should be established, with requirements for regular re-certification;

°a requirement should be established that notice be given to the Ministry of Environment of intent to establish a collection depot prior to the commencement of operations, including the specific location and the identify of the owner and operator. The notice should be posted on the Environmental Bill of Rights Registry with a public comment period of not less than 30 days. Operations should not be permitted to commence until the notice of intent is acknowledged by the Ministry of Environment. The Ministry should have the option of declining to permit the

commencement of operations or of imposing specific additional conditions on individual facilities;

the Ministry should not acknowledge a notice of intent unless it includes a confirmation from the local fire department that the facility is in compliance with fire safety requirements;

waste oil collection depot operators should be required to file quarterly reports with the Ministry of Environment regarding the amounts of waste oil, oil filters, oil containers, hydraulic and transmission fluids, and anti-freeze collected and their fates. These reports should be made available to the public, along with an annual summary report on depot operations across the province.

VIII-13.

The specific locations of waste oil collection depots facilities and the identifies of their owners and operators should be provided in the public registry proposed in Recommendation IV-2.

VIII-14.

The requirements of the Marinas Regulation regarding the provision of containers for the collection of waste oil and containers should be upgraded. This should include the addition of requirements for the provision of separate containers for fuels, lubricants, oil filters, and lubricant containers. Requirements regarding the storage, handling and recycling of these materials similar to those for waste oil collection depots should be established as well.

IX. HOUSEHOLD HAZARDOUS WASTES

IX-1.

The 'administrative' exemption from the requirements of Regulation 347 for lead-acid battery recycling activities should be withdrawn.

IX-2.

Other battery recycling operations and activities should not be exempted from the approvals, generator registration and manifesting requirements of Part V of the Environmental Protection Act and Regulation 347.

IX-3.

The manufacturing, sale, import, and export of alkaline-manganese and zinc-carbon batteries with mercury content that was intentionally introduced should be banned through a regulation made under the Canadian Environmental Protection Act.

IX-4.

The Ministry of the Environment should establish specific requirements regarding the operation of sites which collect HHW from the public which are not subject to certificate of approval requirements. These requirements should address:

°staff training, with particular emphasis on regulatory requirements, occupational health and safety, and fire and spill prevention and response;

°storage limits and requirements related to storage practices;

°facility location;

°provision of notice of intent to establish facilities to the Ministry of the Environment, and a requirement for acknowledgement by the Ministry prior to the commencement of operations. Notice of intent should also be posted on the Environmental Bill of Rights registry for a minimum of 30 days for public comment. The Ministry should have the option of declining to permit the commencement of operations or of imposing specific additional conditions on individual facilities;

°ensuring that the commencement of operations is not permitted until a confirmation of compliance with fire protection requirements is received by the Ministry;

°regular reporting requirements to the Ministry, and public access to such reports; and

°the reporting of the location and ownership of operating sites through the public registry proposed in Recommendation IV-2.

IX-5.

The Province should move towards establishment of life-cycle producer responsibility for the collection, recycling and disposal of products which may become household hazardous wastes, including waste oil, paint, pesticides, fuels, batteries and solvents. The establishment of deposit/refund and return retainer requirements should be considered for products for which producer responsibility arrangements are not made by manufacturers or retailers.

IX-6.

Waste collection depots established as elements of producer responsibility systems should be subject to the requirements set out in Recommendation IX-4. Other elements of 'manufacturer controlled networks' should be subject to regular certificate of approval requirements regarding systems and facilities handling 'subject' wastes.

ENDNOTES

Section 1 Notes

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or
 - (c) constituting or that may constitute a danger in Canada to human life or health."

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