



# ***An Environmental Agenda for Ontario***

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## **HAZARDOUS WASTES AND TOXIC SUBSTANCES**

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for

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# ENVIRONMENTAL AGENDA FOR ONTARIO BACKGROUND PAPER<sup>1</sup>

## HAZARDOUS WASTES AND TOXIC SUBSTANCES

by  
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### Table of Contents

<b>EXECUTIVE SUMMARY</b> .....	1
<b>INTRODUCTION</b> .....	4
<b>A Policy Framework for Hazardous Waste Management in Ontario</b> .....	5
<b>HAZARDOUS WASTE GENERATION, COMPOSITION AND FATE IN ONTARIO</b> ..	6
<b>Hazardous</b> .....	11
<b>The Environmental Impacts of Hazardous Waste Diposal</b> .....	12
<b>Hazardous Waste Information</b> .....	14
<b>THE REGULATORY FRAMEWORK FOR HAZARDOUS WASTE MANAGEMENT IN ONTARIO</b> .....	16
<b>Hazardous Materials vs. Hazardous Wastes</b> .....	20
<b>Household Hazardous Wastes</b> .....	20
<b>WASTE REDUCTION AND POLLUTION PREVENTION</b> .....	23
<b>Pollution Prevention Planning</b> .....	23
<b>Persistent Toxic and other Substances of Concern</b> .....	25
<b>Hazardous Waste Charges</b> .....	27
<b>TREATMENT AND DISPOSAL FACILITIES</b> .....	27
<b>CONTAMINATED SITES</b> .....	29
<b>STRENGTHENING GOVERNMENT AND INDUSTRY ACCOUNTABILITY IN HAZARDOUS WASTE MANAGEMENT</b> .....	30
<b>CONCLUSIONS</b> .....	31
<b>SUMMARY OF RECOMMENDATIONS</b> .....	33

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<sup>1</sup>. This paper is one of nine research studies prepared for the Environmental Agenda for Ontario Project. The other studies include: Air Quality; Water; Energy; Food and Agriculture; Biodiversity Conservation; Natural Resources Management; Human Settlements; Solid Waste Management; and Democracy.

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## **EXECUTIVE SUMMARY**

Ontario industries and institutions generate between 1.2 and 5 million tonnes of toxic, explosive, flammable, reactive, pathological, corrosive or otherwise hazardous wastes each year, accounting for approximately 60% the total produced in Canada. The past four years have witnessed a dramatic growth in the generation of hazardous wastes by Ontario industry, with a reported 50% increase in wastes sent-off site for disposal between 1994 and 1997. In addition, imports of hazardous waste from the United States into Ontario for 'recycling' and disposal grew by a factor of more than four times between 1993 and 1997.

Virtually all of the fates of hazardous waste, including incineration, landfilling, disposal in municipal sewer systems, and even reuse or recycling, have the potential to pose threats to the public health and safety and the environment. Despite this, the province lacks basic information about the generation and fate of hazardous waste in Ontario. It doesn't, for example, have a reliable estimate of the total generation of hazardous waste by Ontario industry, or how much is discharged into Ontario's lakes and rivers, or into municipal sewer systems, each year.

There are major gaps in the framework of laws and regulations for controlling the handling and disposal of hazardous wastes. There are, for example, no provincial controls at all on the disposal of hazardous wastes into municipal sewer systems. According to some estimates, this is one of the leading fates of such wastes in Ontario. The province also lacks modern emission standards for hazardous or biomedical waste incinerators, and continues to permit the disposal of liquid industrial wastes as 'dust suppressants' on rural roads.

Many hazardous waste 'recycling' sites continue to operate under exemptions for the normal rules for waste handling facilities. This continues to be the case even after the disastrous July 1997 Plastimet plastics 'recycling' site fire in Hamilton, and the long history of the operation of illegal disposal facilities under the guise of 'recycling' in the province.

A thorough overhaul and modernization of the province's laws and regulations regarding the generation, handling and disposal of hazardous wastes is needed. This is necessary to ensure the protection of public safety, health and the environment, and to promote a long term solution to the province's hazardous waste crisis through waste reduction and pollution prevention. Such an undertaking would include the following measures.

### **Recommendations**

1. The province should undertake major reforms to its regulatory framework for the generation, handling and disposal of hazardous wastes. These should include:
  - the strengthening of regulatory controls on waste 'recycling' and 'processing' operations;
  - the establishment of stringent approval, emission and operating standards

- for hazardous and biomedical waste incinerators and facilities burning hazardous waste as 'fuel;'
  - the development and implementation of provincial standards for industrial discharges to sewers;
  - the adoption of severe restrictions on the land disposal of hazardous and liquid industrial wastes; and
  - the imposition of a ban on disposal of such wastes as 'dust suppressants.'
2. Facilities that generate or handle hazardous waste should be required to provide an annual report to the province on the generation, composition and fate of all of their designated non-product outputs. The province should publish an annual report on the the management of hazardous wastes in Ontario on the basis of this information.
  3. The province should adopt a *Pollution Prevention Planning Act*, following the model of successful legislation in the states of Massachusetts and New Jersey, to require facilities to develop plans to reduce their use of toxic substances and generation of hazardous wastes.
  4. The province should impose a per tonne charge on the generation of hazardous wastes by industry to encourage waste reduction. The revenues generated through the charge should be used to support programs to regulate and prevent pollution, emergency and spills response, and the remediation contaminated sites.
  5. The province should revise its standards for air and water pollution and pesticides to target the substances on the primary candidates substances list of its 1993 Canadidate Substances List for Bans or Phase-Outs for virtual elimination, defined as the cessation of the use, generation or release to the environment of these substances.
  6. The province should adopt a comprehensive policy and new legislation on the remediation of contaminated sites. This should address the allocation of liability, the creation of an 'orphan' sites remediation fund, clean-up standards, and the establishment of a publicly accessible registry of contaminated sites in Ontario.
  7. The province should establish life-cycle producer responsibility requirements for the collection, recycling and disposal of products which may become household hazardous wastes, such as 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.
  8. The province should adopt a regulation designating all new or expanded hazardous waste treatment or disposal facilities for review under the *Environmental Assessment Act*. The *Environmental Protection Act* should be amended to require public hearings before the Environmental Assessment Board under the prior to the approval of such facilities. Provision should be made for

intervenor funding to *bona fide* public interest intervenors in such hearings.

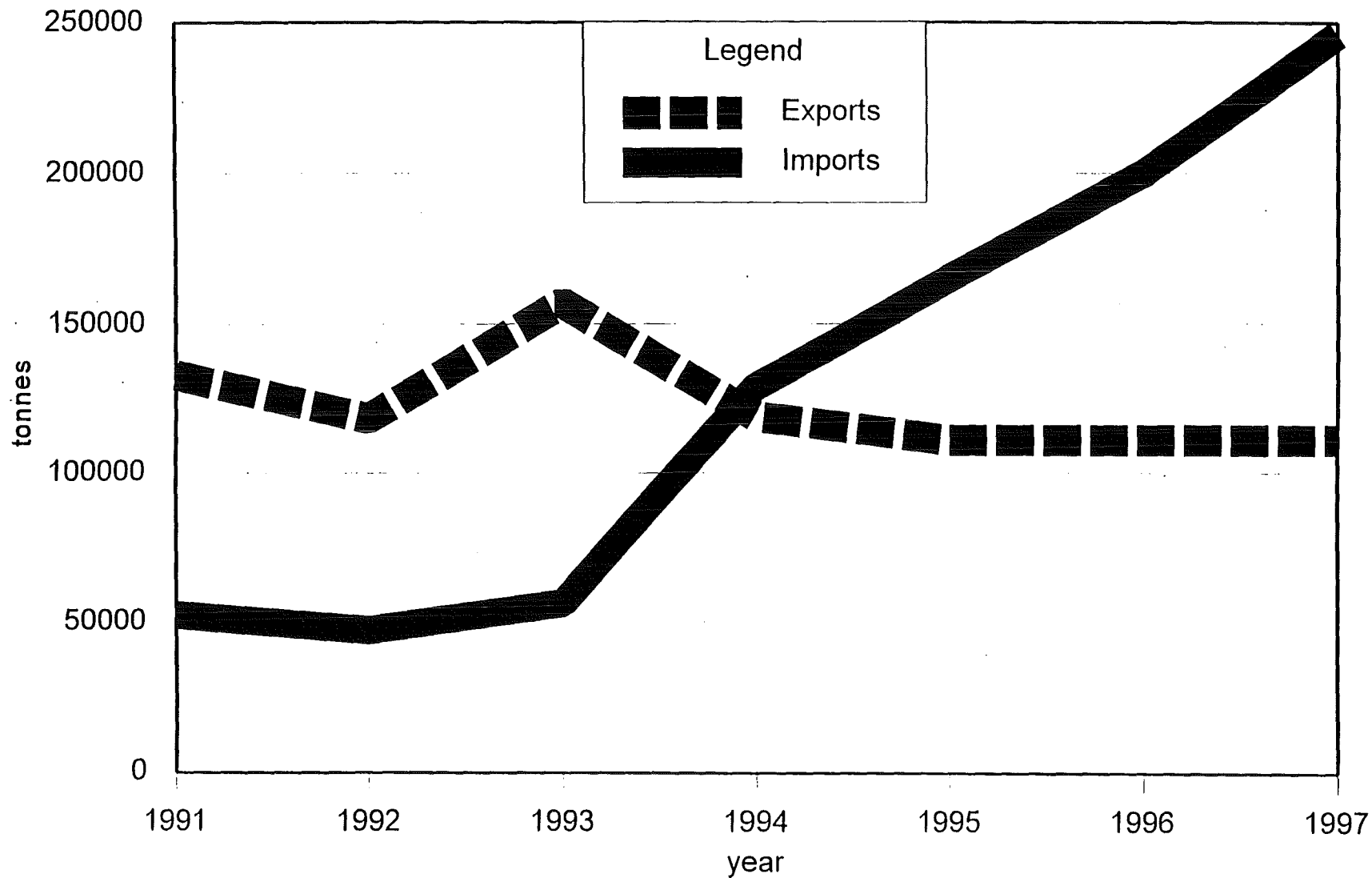
9. The province should move towards the establishment of policy and regulatory system that controls the generation, use, handling and disposal of materials on the basis of their hazardous properties, regardless of whether they are a 'product,' 'recyclable material' or 'waste.'





# Hazardous Waste Imports / Exports

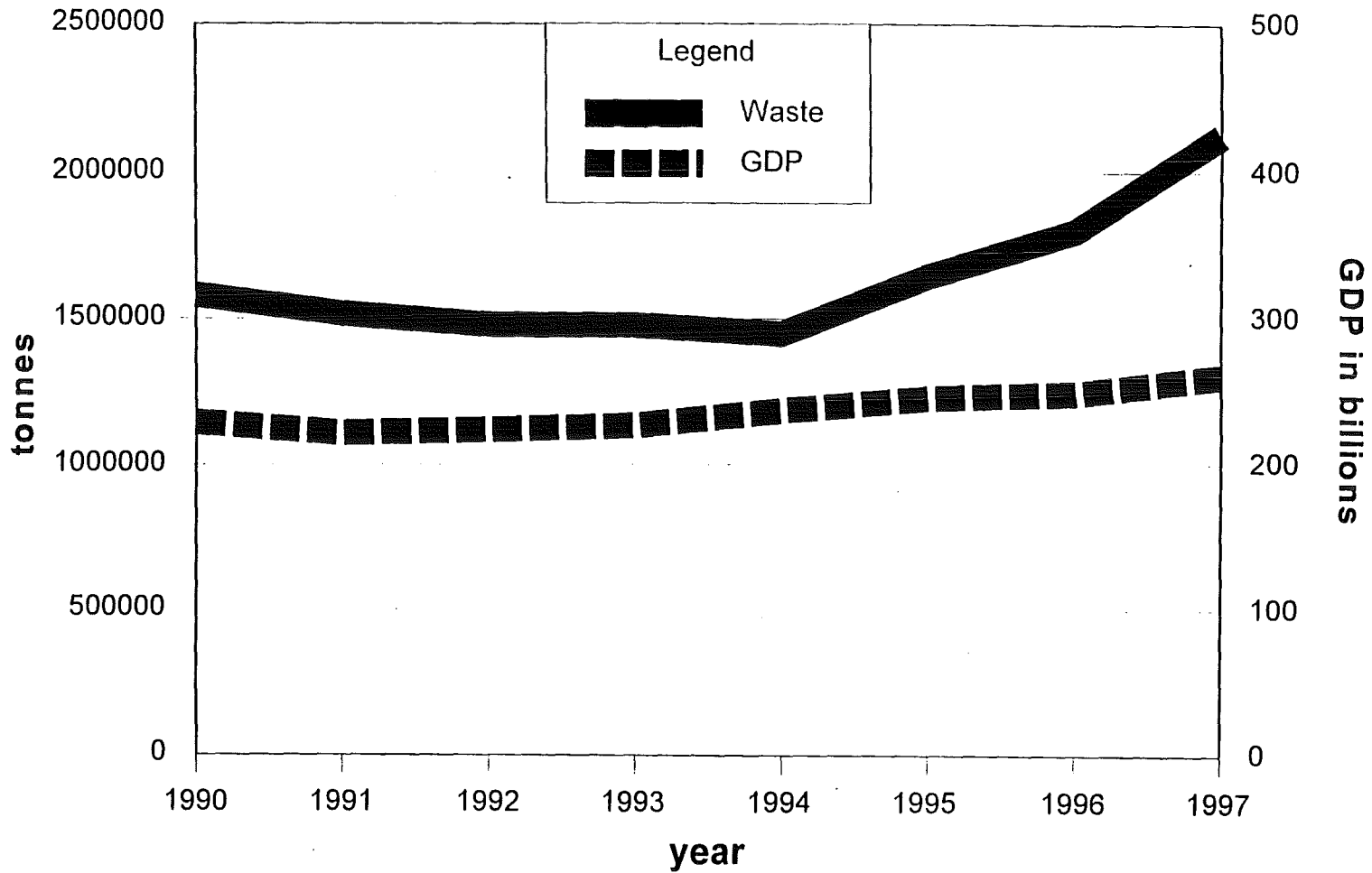
Ontario from / to other jurisdictions





# Waste Disposal in Ontario

Off-site Hazardous / Liquid Industrial





## ENVIRONMENTAL AGENDA FOR ONTARIO BACKGROUND PAPER:

### HAZARDOUS WASTES AND TOXIC SUBSTANCES

"Ontario's focus needs to change from one of granting regulatory relief to polluters to improving its commitments to the health of its residents and the natural environment."<sup>1</sup>

*Eva Ligeti*, Environmental Commissioner for Ontario, April 1998.

#### INTRODUCTION

Ontario is by far Canada's largest generator of hazardous wastes, producing between 1.2<sup>2</sup> and 5 million<sup>3</sup> tonnes per year. This accounts, by some estimates, nearly 60% of the total generation of hazardous wastes in Canada.<sup>4</sup> As of 1996, the most recent year for which data is available, there were approximately 32,000 facilities registered with the province as hazardous waste generators.<sup>5</sup>

At one time, the province of Ontario was in the forefront of efforts to control and reduce the generation and disposal of hazardous wastes in North America. However, the province's regulatory framework for the management of hazardous wastes has been static for more than a decade, and is becoming increasingly outdated in comparison to other jurisdictions. In addition, longstanding gaps in the system, identified by the Provincial Auditor,<sup>6</sup> the Ministry of the Environment itself,<sup>7</sup> and others<sup>8</sup> have remained unaddressed.

#### DEFINING HAZARDOUS WASTES

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

The need for reform has been highlighted by such recent disasters, as the July 1997 Plastimet PVC recycling site fire, and the continuing evidence of the illegal disposal of hazardous wastes.<sup>9</sup> In fact, a report released by the federal Solicitor-General's department in August 1998, assessed environmental crime, particularly the improper storage or disposal of hazardous wastes, as being second only to illicit drugs in its impact on Canada.<sup>10</sup>

## THE PLASTIMET FIRE

The Plastimet fire started on July 9, 1997, and raged for three days in a mixed industrial and residential neighbourhood of the City of Hamilton. It consumed 400 tonnes of plastic, including polyvinyl chloride (PVC), and resulted in a one day evacuation of area residents because of fears of airborne toxics. (One of the by-products of PVC combustion is dioxin, an extremely toxic substance that is thought to cause cancer and disruptions to endocrine systems.

The Plastimet facility had been granted an exemption from the requirement to obtain a Certificate of Approval under the *Environmental Protection Act* by the Ministry of the Environment on the basis that it was storing recyclables to meet a "realistic" market demand, as per the 'recycling' facility exemption in Regulation 347.

At the request of the Solicitor-General, the Ontario Fire Marshal investigated the fire. In its August 1997 report, the Office of the Fire Marshal concluded that:

"It is evident there is a potential for other fires, similar to the Plastimet fire, to occur in Ontario."

As a result, the Office recommended that the Ministry of the Environment strengthen its regulatory controls on recycling and other waste handling operations.

In her 1997 Annual Report to the Legislature, the Environmental Commissioner for Ontario noted that the Ministry of the Environment had failed to demonstrate any 'realistic market demand' for the plastics stored at Plastimet, and that the Ministry was proposing to maintain the 'recycling' site exemption and to allow more types of recyclable materials to be exempt from waste approvals in its proposed reforms to the province's waste management regulations.

**Adapted from:** Environmental Commissioner of Ontario, *1997 Annual Report*, pg.67.

## A Policy Framework for Hazardous Waste Management in Ontario

The province's regulatory and policy framework for the management of hazardous wastes should seek to achieve three basic goals. First, the system must ensure the protection of public safety, public health and the environment in the handling and disposal of hazardous wastes and materials. In order to achieve this goal, the regulatory system must ensure that the generation, handling and fate of wastes are known and under some form of public oversight. Standards for the protection of public safety, health and the protection of the environment should be in place, including bans and phase-outs the generation of certain types of wastes, and prohibitions on certain treatment and disposal practices, where necessary.

### DEFINING POLLUTION PREVENTION

In July 1995 the federal government adopted the following definition of pollution prevention:

"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"

**Source:** Government of Canada, *Pollution Prevention: A Federal Strategy for Action*, July 1995.

Secondly, it should provide comprehensive, accurate, and publicly available information on the generation, sources, composition and fate of hazardous wastes in the province. This is essential from the perspectives of the right of members of the public to know about the wastes generated in, transported through, or disposed of within their communities, good public policy decision-making, and government and industry accountability for their environmental policies and activities.

Third, the province's regulatory and policy structures must promote waste reduction at source through pollution prevention. This emphasis reflects the degree to which virtually all of the fates of hazardous wastes, once generated, have the potential to cause harm to the environment and human health and safety.

### HAZARDOUS WASTE GENERATION, COMPOSITION AND FATE IN ONTARIO

It is 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,<sup>11</sup> and the limited scope of others, such as the federal National Pollutant Release Inventory (NPRI).<sup>12</sup> These problems are 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 Provincial Auditor<sup>13</sup> and others<sup>14</sup> regarding the reliability of the Waste Generator Database data.

The most recent published estimates of the total generation of hazardous wastes in Ontario, based on 1991 Waste Generator Database data, range from 1.15<sup>15</sup> to 3 million tonnes per year.<sup>16</sup> In its November 1994 decision regarding the Ontario Waste Management Corporation's proposed hazardous waste treatment and disposal facility, the Environmental Assessment Board accepted an estimate that hazardous waste

#### THE ONTARIO WASTE MANAGEMENT CORPORATION

The Ontario Waste Management Corporation (OWMC) was a Crown Corporation, created in 1980, to construct a comprehensive hazardous waste treatment and disposal facility for Ontario. The OWMC's undertaking was designated for review under the *Environmental Assessment Act* in 1985. Hearings before a Joint Board of the Environmental Assessment Board and the Ontario Municipal Board commenced in 1989. In November 1994, the Joint Board rejected the Corporation's application for approval of its proposed facility, to be located in Lincoln, Ontario. The Provincial cabinet rejected an appeal of the Board's decision by the OWMC in February 1995. The OWMC was dissolved in September 1995.

generation in Ontario could be expected to rise at a rate of approximately 3% per year.

However, more recent data from the Ontario Waste Manifest Database System<sup>17</sup> and the National Pollutant Release Inventory<sup>18</sup> have indicated a dramatic rise in the amounts of hazardous wastes and pollutants being transferred off the site of their generation for disposal in Ontario over the past few years.

**Table 1** shows a total of 2.1 million tonnes of hazardous waste manifested in 1997, a growth of approximately 50% since 1994. This growth has been attributed to increases in economic activity by the provincial government. However, the growth in waste generation exceeds the growth in the province's gross domestic product for the 1994-97 period by a factor of more than three to one.<sup>19</sup>

**Table 1 Off-site Hazardous and Liquid Industrial Waste Disposal in Ontario**

Year	Total Manifest Data (Tonnes)
1990	1,579,799
1991	1,516,272
1992	1,478,088
1993	1,476,661
1994	1,447,448
1995	1,646,382
1996	1,800,000
1997	2,125,000

Data on waste transfers in Ontario from the NRPI for the 1994-1996 reporting years is presented in **Table 2**.

**Table 2 National Pollutant Release Inventory Pollutant Transfers in Waste: Ontario 1994-1996**

Year	Transfers of Toxic and Carcinogenic Pollutants (Tonnes)	Transfers of All Pollutants (Tonnes)
1994	N/A	22,222 <sup>20</sup>
1995	5,218	33,922
1996	4,595 <sup>21</sup>	42,643 <sup>22</sup>

As shown in **Table 3** 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.



**Table 3: Ontario Hazardous Waste Generation by Industrial Sector (1991)**

<b>Sector</b>	<b>Quantity (tonnes)</b>	<b>% of Total</b>
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%
<b>Total</b>	<b>1,492,808</b>	<b>97%</b>

As **Table 4** indicates, 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.

**Table 4 : Ontario Hazardous Waste Stream Composition**

Waste Category	OWMC (1988) (Including Liquid Industrial Waste but Excluding Registerable Solid Waste)		Canadian Hazardous Waste Inventory (1991) (Excluding Liquid Industrial Waste and Registerable solid waste)	
	Quantity (Tonnes)	% of Total	Quantity (Tonnes)	% of Total
Heavy Metal Solutions and Residuals	2333600	65.1%	785474	51%
Sludges and Inorganic Residuals	112800	3.1%	282740	18%
Solvents and Organic Solutions	185900	5.2%	142442	9%
Anion Complexes	3200	0.1%	85758	6%
Clean-up Residuals	8200	0.2%	69434	4%
Organic and Oily Wastes	219200	6.1%	67327	4%
Oils and Greases	41400	1.2%	32132	2%
Misc. Chemicals and Products	15000	0.4%	28623	2%
Organic Sludges and Still Bottoms (no oil)	50700	1.4%	20785	1%
Paint and Organic Residuals	68700	1.9%	13490	1%
Aqueous Solutions with Organics	521300	14.6%	13322	1%
Oil/Water Mixtures	21600	0.6%	2148	<1%
Pesticides and Herbicide Wastes	400	0.0%	1262	<1%
<b>Total</b>	<b>3582000</b>	<b>100%</b>	<b>1544937</b>	<b>100%</b>

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. These fates are outlined in **Table 5**. The NPRI data indicates that direct releases to the atmosphere, which are not reported under the provincial Waste Generator Registry Database, are also a significant fate, particularly for organic solvents like toluene and xylenes.<sup>23</sup>

**Table 5: Fate of Wastes Disposed of On-Site (1991)**

Method of Disposal	Total Excluding Liquid Industrial and Registerable Solid Wastes		Total Subject Wastes	
	Quantity (Tonnes)	Percent of Total	Quantity (Tonnes)	Percent of Total
Sanitary Sewer	383300	38%	394000	27%
Water Pollution Control Plant	266500	27%	384200	27%
Landfill/Landfarm	260600	26%	371100	26%
Other Treatment	122600	12%	143000	10%
Incineration	35800	3.5%	112000	8%
Dust Suppression	1600	1.6%	29400	2%
Waste-Derived Fuel	100	0.1%	500	0.07%
<b>Total</b>	<b>1070500</b>	<b>100%</b>	<b>1434200</b>	<b>100%</b>

The fates of wastes transferred off-site for disposal are outlined in **Table 6**. These include incineration, processing and landfilling. 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.

**Table 6: Off-Site Disposal of Ontario Subject Waste 1993 and 1995**

Receiver type	1993 <sup>24</sup> (Tonnes)	1995 <sup>25</sup> (Tonnes)
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
<b>Total</b>	<b>1,265,000</b>	<b>1,428,874</b>

## Hazardous Waste Imports and Exports

As shown in **Table 7**, imports of hazardous wastes into Ontario have risen dramatically over the past few years, growing by a factor of more than four times since 1993.<sup>26</sup> Ontario has been identified the leading importer of Toxic Release Inventory (TRI) substances from the U.S for 'recycling' and disposal in North America.<sup>27</sup>

**Table 7: Ontario Hazardous Waste Imports from Other Jurisdictions**

Year	International Waste Imports (Tonnes)
1991	52,510
1992	47,265
1993	56,439
1994	129,188
1995	N/A
1996	N/A
1997	246,000

Figures regarding the composition of hazardous waste imports into Ontario are not available. The most recently available figures for the composition of hazardous waste imports to all of Canada are presented in **Table 8**.

**Table 8: Composition of Hazardous Waste Imports to Canada (1995)<sup>28</sup>**

Waste Class	Quantity (Tonnes)	Per Cent of Total
Leachable Toxic Wastes	117,239	30%
Corrosive Liquids	109,193	28.5%
Battery Wastes	76,627	20.0%
Environmentally Hazardous Substances	21,456	5.6%
Flammable Liquids	21,072	5.5%
Metal and Mineral Wastes	13,793	3.6%
Other	approx: 23,000	6.2%
<b>Total</b>	<b>383,134</b>	<b>100%</b>

As **Table 9** indicates, exports of hazardous wastes from Ontario appear to be roughly stable.<sup>29</sup> There is no reported transboundary traffic in hazardous wastes from Ontario to destinations outside of Canada other than the U.S. The dramatic growth in imports of hazardous wastes from the United States may reflect the strengthening of

regulatory controls on the land disposal of hazardous wastes in that country,<sup>30</sup> while controls in Ontario have remained static or, in some cases, been weakened.

**Table 9: Ontario Hazardous Waste Exports to Other Jurisdictions**

Year	International Waste Exports (Tonnes)
1991	133,177
1992	118,367
1993	156,945
1994	118,853
1995	N/A
1996	N/A
1997	111,000

The composition of all Canadian hazardous waste exports to the United States in 1995 is outlined in **Table 10**.

**Table 10: Composition of Canadian Hazardous Waste Exports (1995)<sup>31</sup>**

Waste Class	Quantity (tonnes)	Per Cent of Total
Metals and Mineral Wastes	66,215	29.3%
Battery Wastes	52,429	23.2%
Corrosive Liquids	42,486	18.8%
Flammable Liquids	23,955	10.6%
Leachable Toxic Wastes	12,881	5.7%
Environmentally Hazardous Waste	8,362	3.7%
Other	19,660	8.7%
<b>Total</b>	<b>225,989</b>	<b>100%</b>

### **The Environmental Impacts of Hazardous Waste Diposal**

Virtually all of the fates of hazardous wastes generated or imported into Ontario are associated with significant environmental impacts. Discharges of hazardous wastes to municipal sewer systems can, 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.<sup>32</sup>

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

**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 which operated 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 employee's 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.

pollutants.<sup>33</sup> 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.<sup>34</sup> 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.<sup>35</sup> Transfers off-site also carry 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.<sup>36</sup>

## Hazardous Waste Information

The composition and fate of some elements of the Ontario hazardous waste stream, such as PCB's<sup>37</sup> and biomedical wastes,<sup>38</sup> 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,<sup>39</sup> 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.<sup>40</sup> 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 calculated by the OWMC to be the largest single fate of hazardous wastes in the province,<sup>41</sup> the Ministry of the Environment is unable to provide estimates of the total amounts, composition or sources of these discharges, stating that it has no role in their monitoring.<sup>42</sup> The Ministry is also unable to provide estimates of total discharges of pollutants to Ontario's waterways from the 190 industrial facilities regulated under the Municipal-Industrial Strategy for Abatement (MISA) program.<sup>43</sup>

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.<sup>44</sup> All of these activities are associated with potentially significant environmental impacts.

The Ministry of the Environmental has also provided a number of 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. These have resulted in additional gaps in the available data. These are further compounded by the granting of informal 'administrative' exemptions for activities related to the recycling of lead-acid batteries,<sup>45</sup> and to permit the use of 'black liquor' from a pulp and paper mill as a dust suppressant.

In order to address these serious gaps in the information available to the province and the public, the province's monitoring and reporting requirements regarding the generation, handling and fate of hazardous and other 'subject' wastes require a complete overhaul and modernization.

## Recommendations

1. The Waste Generator Registration process should be revised 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 annual reports should also include information on substances in storage and non-production waste generation.

2. A publicly accessible registry of pesticide container, waste oil and other sites dealing with 'subject' wastes operating under exemptions from the general requirements of the province's waste management regulations should be established, 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.

3. Industrial facilities regulated through the MISA program should be required to provide discharge monitoring data to the Ministry of the Environment in a standardized electronic format. This data should be made available to the public in a timely, easily accessible and user-friendly format.

4. The Ministry of the Environment should establish a requirement that municipalities provide annual reports to the Ministry regarding permitted and estimated total industrial discharges to their sewer systems. These reports should be made available to the public.

5. The Ministry of the Environment should establish a requirement that landfill operators report direct leachate discharges to municipal sewer systems to the Ministry. These reports should be made available to the public.

6. The Ministry of the Environment should establish a requirement that pesticide vendors report their sales of pesticides to the Province, including information on the types and quantities of pesticides sold, on a regular basis. Commercial applicators and municipalities should be required to report their use of pesticides on a similar basis. This information should be made available to the public.

7. The Ministry of the Environment should publish an annual report on the management of hazardous and other related wastes in the province of Ontario. This would include information on- and off-site management, discharges from MISA regulated industrial facilities, and industrial discharges to sewers. The data collected by the Ministry on the generation and fate of hazardous and other 'subject' wastes should also be made available to the public in a timely, comprehensive and user-friendly electronic format.



## THE REGULATORY FRAMEWORK FOR HAZARDOUS WASTE MANAGEMENT IN ONTARIO

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. As noted earlier, these include certain types of hazardous waste 'recycling' facilities, 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.<sup>46</sup> However, these standards are often vague, and insufficiently specific to be enforceable. Operators are not even required to report the location of their facilities to the Ministry in some instances, and none are required to report regularly to the Ministry on the amounts of waste received, in storage, or its fate.

In addition, the statutory basis of the Ministry's 'administrative' exemptions from the 'subject' waste from the requirements of Part V of the *Environmental Protection Act* and Regulation 347 for lead-acid battery recycling, and the 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' are open to serious question. Significant environmental concerns have been identified in relation to these activities.

## 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. As 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 under 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 have 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.

In December 1998, the Ministry of the Environment Stated that it was giving Norampac (formerly Domtar) 30 days to develop a plan to phase out the use of Dombind within two years. As of March 1999, no action had been taken by the Ministry to implement this requirement.

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

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 sewer systems, and no action has been taken to address a longstanding need for the imposition of restrictions on the land disposal of hazardous wastes.<sup>47</sup> 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.

These gaps in the regulatory framework have been compounded by the dramatic reductions in the resources available to the Ministry of the Environment over the past three years. The Ministry's operating budget has declined by approximately 45% between the 1994-95 and 1998-99 fiscal years.<sup>48</sup> 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.<sup>49</sup> There has also been a marked decline in the environmental law enforcement efforts of the Ministry over the past

three years.<sup>50</sup>

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 the province's waste management regulations presented by the Ministry of the Environment in July 1996,<sup>51</sup> and largely re-iterated by the Ministry in June 1998.<sup>52</sup>

Among other things, the province's proposals would:

- eliminate certificate of approval requirements for the on-site handling, 'temporary' storage and processing of 'subject' wastes, including wastes brought in from off-site sources and PCB wastes; 'field operations' involving the handling of hazardous wastes; and the disposal of 'subject' wastes as dust suppressants;
- remove current fire and spill protection, site security, staff training and other requirements for 'selected' waste depots;
- confirm the expansion of the 'recycling' exemption to include such specific substances as 'chop line' residue, silver bearing photochemical wastes, and the use of waste 'pickle liquor' in municipal sewage treatment plants;<sup>53</sup>
- exempt waste batteries, precious metal bearing waste, and certain types of mercury containing waste from waste generation registration and manifesting requirements; and
- permit the disposal of untreated blood from hospitals and funeral homes into municipal sewer systems and the disposal of 'treated biomedical waste' in sanitary landfills.<sup>54</sup>

The Ministry proposals have been 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.<sup>55</sup>

This 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.<sup>56</sup>

The Ministry's proposals would also remove opportunities for public participation in decision-making on waste handling and disposal activities, compound the existing gaps in the available data regarding the management of hazardous and other 'subject' wastes in the province, while offering no apparent environmental benefit.<sup>57</sup>

In addition to its proposed revisions to its waste management regulations, the Ministry of the Environment has proposed to remove the monitoring and reporting

requirements under the MISA industrial water pollution control regulations.<sup>58</sup> It has also proposed to weaken its model Municipal Sewer Use By-Law, including the removal of specific prohibitions on the disposal of certain types of hazardous wastes in sanitary and storm sewers.<sup>59</sup>

The Ministry's proposals fail to address the gaps in the existing regulatory framework for waste management identified by the Office of the Fire Marshal, the Provincial Auditor and others. Rather they move in the opposite direction of the Environmental Commissioner of Ontario's conclusion that:

"Ontario's focus needs to change from one of granting regulatory relief to polluters to improving its commitments to the health of its residents and the natural environment."<sup>60</sup>

A fundamentally different approach to the management of hazardous wastes is than that currently being taken by the Ontario government is required to ensure a safe and environmentally sustainable future for present and future residents of the province. 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.

## **Recommendations**

8. The Ministry of the Environment's regulatory oversight of hazardous and liquid industrial waste 'recycling' and 'processing' activities should be strengthened. 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;

9. Stringent approval, emission and operating regulatory standards for biomedical, liquid industrial and hazardous waste incinerators, and facilities using 'subject' waste as fuel, should be developed and adopted by the Ministry of the Environment.

10. The Ministry of the Environment should establish pre-treatment standards for industrial discharges to sewers, as proposed in the original MISA program,<sup>61</sup> and establish of pre-treatment requirements for landfill leachate discharges or transfers to municipal sewage treatment plants.

11. Restrictions on the land disposal of hazardous wastes should be imposed by the Ministry of the Environment, beginning with a ban on the land disposal of liquid organic wastes.

12. The use of hazardous or other 'subject' wastes as dust suppressants should be phased-out.

13. The Ministry of the Environment should adopt a permanent prohibition of the use of waste oil as fuel in small space heating furnaces.<sup>62</sup>

14. A modernized definition of biomedical wastes should be adopted by the province. This should not permit the disposal of untreated blood or bodily fluids in sanitary sewers or septic systems.

15. All waste pesticides should be included in the province's definition of hazardous wastes.

### **Hazardous Materials vs. Hazardous Wastes**

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.

A hazardous materials approach 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. In addition, such an approach would open possibilities for the integration of environmental and occupational health and safety standards in the handling of hazardous materials.

### **Recommendation:**

16. The province should move towards the establishment of policy and regulatory system that controls the generation, use, handling and disposal of materials on the basis of their hazardous properties, regardless of whether they are a 'product,' 'recyclable material' or 'waste.'

### **Household Hazardous Wastes**

Household hazardous waste (HHW) is the residual of products used in the home which are toxic, combustible, explosive, and/or flammable.<sup>63</sup> 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.<sup>64</sup> 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.

Published estimates of the total amount of HHW generated in Ontario annually range from 20,000<sup>65</sup> to 86,000 tonnes/yr.<sup>66</sup> A detailed study of the composition of the Ontario HHW stream was completed by the Association of Municipal Recycling Coordinators (AMRC) is presented in **Table 10**.

**Table 10: 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 <sup>oo</sup>	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.

<sup>oo</sup> (includes stains, cleaners, driveway sealers, fuel, rust/metal paint, adhesive, paint remover/thinner, liquid plastic).

The elimination of provincial funding for all municipal HHW programs was announced in November 1995. There are currently no requirements in Ontario that firms make arrangements for the collection and disposal of products which may become HHW. This is in contrast to the approach taken in many other provinces, most notably British Columbia.<sup>67</sup>

In June 1998, the Ministry proposed to establish a "standardized approval" system for depots that would collect HHW from the public, including batteries, domestic pesticides, agricultural and commercial pesticides, mercury containing lamps, light switches thermometers and thermostats, paints, pharmaceuticals, and propane.<sup>68</sup>

A "standardized" approval system would allow such facilities to operate without a Certificate of Approval from the Ministry of the Environment, provided that they met certain conditions prescribed by the Ministry. The Ministry's proposals have been subject to substantial criticism due to the failure to articulate criteria for the application of standardized approvals, the inadequacy of the proposed standards, lack of an enforcement plan, the loss of public notice and comment opportunities under the *Environmental Bill of Rights*, and their implications for the common law rights of persons who may be adversely affected by activities approved through standardized approvals.<sup>69</sup>

## Recommendations

17. 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 full certificate of approval requirements.<sup>70</sup> 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 acknowledgement by the Ministry prior to the commencement of operations;
- confirmation of fire protection requirements prior to the commencement of operations;
- regular reporting requirements, and public access to reports; and
- the reporting of the location and ownership of operating sites through the public registry proposed in Recommendation 2.

18. 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.

## **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.

As the Plastimet fire and subsequent report of the Office of the Fire Marshal<sup>71</sup> highlighted, this approach poses significant risks to public safety and environmental quality. It also contradicts a wide body of literature and empirical evidence identifying stringent and certain regulatory demands, supported by expectations of enforcement, as the major drivers for the development of new environmental technologies and skills.<sup>72</sup>

### **Pollution Prevention Planning**

In the United States, the federal government and many states have adopted legislation to link reporting activities under the Toxic Release Inventory<sup>73</sup> 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.<sup>74</sup> By contrast, the current pollution prevention planning program sponsored by the province is of a voluntary nature, and has only engaged approximately 200 participating facilities, many of which are not significant industrial waste generators.<sup>75</sup>



## TOXICS USE REDUCTION IN MASSACHUSETTS

In 1989 the Massachusetts legislature enacted *Toxics Use Reduction Act*. 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.<sup>76</sup>

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."<sup>77</sup> 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.<sup>78</sup>

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.<sup>79</sup>

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 of Massachusetts Lowell, to provide training for toxics use reduction planners, and conduct research on toxics use reduction technologies.<sup>80</sup>

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%.<sup>81</sup> 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.<sup>82</sup>

## Recommendation

19. 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 be integrated with the revised waste generator registration and reporting requirements proposed in Recommendation 1.

## Persistent Toxic and other Substances of Concern

Persistent, bioaccumulative toxic substances present a well-recognized threat to the environment and human health. This was reflected in the 1978 renewal of the 1972 *Great Lakes Water Quality Agreement* between Canada and the United States. Among other things, the Agreement committed the Parties to the "virtual elimination" of the input of persistent toxic substances into the Great Lakes System, stating that the "philosophy adopted for control of inputs of persistent toxic substances shall be zero discharge."<sup>83</sup>

In its 1990 5th biennial report under the Agreement, the International Joint Commission, the Binational body mandated with overseeing the implementation of the Agreement, stated that:

"We have concluded from wildlife and laboratory animal information that persistent toxic substances in the Great Lakes Basin Ecosystem pose serious risks to living organisms...

Together with available human data, the information leads us to the conclusion that persistent toxic substances in the Great Lakes environment also threaten human health."<sup>84</sup>

These conclusions lead the Commission to recommend that the Parties:

"take every available action to stop the inflow of persistent toxic substances into the Great Lakes environment."<sup>85</sup>

This direction has been reiterated in the Commission's 6th,<sup>86</sup> 7th,<sup>87</sup> 8th<sup>88</sup> and 9th<sup>89</sup> biennial reports under the Agreement. The Commission has also expressed growing concern over the failure the Parties to act on their commitment to the "virtual elimination" of persistent toxic substances from the Great Lakes ecosystem in each report.

In its September 1992 report the Ontario Round Table on the Environment and Economy similarly recommended that the government of Ontario "end the release of persistent bioaccumulative toxic substances by the year 2000."<sup>90</sup>

The elimination of the release of designated substances, or "zero discharge" was defined in 1991 by a Virtual Elimination Task Force, established by the IJC, as the

elimination of all inputs to the ecosystem of persistent toxic substances produced, used, distributed, or disposed of in or around the basin, whether from direct release into waterways or the atmosphere, indirect releases such as agricultural and urban runoff, or inadvertent releases such as spills.<sup>91</sup> In its 1993 final report, the Task Force stated that the zero discharge philosophy implies adopting measures to eliminate any use or synthesis of a substance.<sup>92</sup>

In response to these efforts, in April 1992, the Ministry of the Environment published a report entitled Candidate Substances List for Bans or Phase-Outs, identifying substances to be consider for banning, phasing out or use/release reductions. The original report focused on persistent toxic substances of concern from a surface water perspective. A multi-media version of the report was released in October 1993.<sup>93</sup> The resulting primary list contained 27 substances or substance groups, and the secondary list 63 substances.

Unfortunately, little progress was made on action on the list before June 1995, and efforts to address the substances appear to have halted completely after that date. There was, for example, no evidence of movement towards phase-out or significant reductions in releases of the candidate substances in proposed revisions to air pollution standards presented by the Ministry of the Environment in March 1998.<sup>94</sup>

In addition to the long-standing body of evidence regarding the environmental and human health impacts of persistent toxic substances, other classes of substances have recently emerged as being of high concern. Among the most significant of these have been endocrine disrupting chemicals. These are synthetic chemicals that can mimic, block, and/or interfere with functions of naturally produced female and male hormones in the body, thereby interfering with an organism's development and reproduction. These effects can occur as a result of exposure to extremely low levels of such substances at important stages of fetal or infant development.<sup>95</sup>

## **Recommendation**

20. The substances on the primary candidates substances list should be targeted for virtual elimination in the revision and modernization of the province's standards for hazardous air pollutants.
21. The substances on the primary candidate substances list should be targeted for virtual elimination in review of other standards, including industrial and municipal water pollution control standards under the MISA program and the Model-Sewer-Use By-Law.
22. Reductions in the use and generation of substances on the primary and secondary candidate substances lists should be sought through the pollution prevention planning program proposed in Recommendation 18.
23. The Ministry of the environment should review all of its existing standards to consider the potential impacts of endocrine disrupting substances.

## **Hazardous Waste Charges**

A number of U.S. states, and many jurisdictions in Western Europe have 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.<sup>96</sup>

The application of such a charge should be strongly supported in principle. However, serious concerns exist regarding 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. However, this problem may be avoided by employing the revenues realized through such a charge to support non-regulatory functions, and using the resources released in this way to strengthen the core regulatory capacity of the Ministry.

### **Recommendation**

24. The Ministry of the Environment should implement a charge on the generation of hazardous wastes on a per tonne basis. The revenues obtained through such a charge should be used to support programs and activities related to hazardous wastes and substances including 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.

25. The revenues released through the support of these programs through the application of a hazardous waste charge proposed in Recommendation 23 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 FACILITIES**

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.<sup>97</sup> 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 the phase-out of CFC's will eventually require the treatment of 40,000 tonnes of the chemicals.<sup>98</sup> No method currently exists for the destruction of these substances.<sup>99</sup>

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 destruction and disposal options, and efforts to encourage hazardous waste reduction through the application of pollution prevention skills and technologies.

Within this context, serious concerns have been raised regarding the approach taken by the Ministry of the Environment's to recent approvals of new permanent hazardous waste treatment and disposal facilities. In September 1997, for example, a 15-20 year expansion of the province's only hazardous waste landfill, the Laidlaw Environmental Service's facility Sarnia, was approved without a public hearing before the Environmental Assessment Board.<sup>100</sup>

In addition, in December 1997 the use of a scrap metal smelting furnace as a permanent low-level PCB disposal facility, operated by Gary Steacy Dismantling Ltd was approved. In its decision regarding the facility, the Board questioned 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, due to the lack of intervenor funding.<sup>101</sup>

These events highlight the impact of the expiry of the *Intervenor Funding Project Act* in April 1996, and the erosion of approval requirements related to 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 the establishment of such facilities.

## Recommendations

26. A regulation should be adopted under the *Environmental Assessment Act* designating all proposals for permanent hazardous and other 'subject' waste disposal facilities for review under the Act.

27. The *Environmental Protection Act* should be amended to require public hearings before the Environmental Assessment Board under the prior to the approval of hazardous waste handling or disposal systems or sites.

28. Provision should be made for intervenor funding to *bona fide* public interest intervenors in such hearings.

## CONTAMINATED SITES

The improper management of hazardous wastes in the past has left a significant legacy in 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.<sup>102</sup> The remediation of a former PCB transfer station in Smithville, Ontario for example has cost more than \$50 million to date.<sup>103</sup>

There is no complete inventory of contaminated sites in Ontario or Canada as a whole, 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,<sup>104</sup> with a potential clean-up cost of up more than \$2 billion.<sup>105</sup> 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.<sup>106</sup>

The province's approach to this problem over past few years has been confused. In some cases, Ministry has aggressively sought to impose liability for clean-up on past and present owners and occupiers of contaminated sites.<sup>107</sup> In absence of remediation fund for sites for which the responsible party no longer exists, or cannot be identified, this has been seen as the only way to avoid public having to fund site clean-ups.

However, there is considerable anecdotal evidence that this practice has had the effect of discouraging the redevelopment of potentially contaminated sites. This has been particularly true with respect to former industrial lands in urban areas. The redevelopment of such lands is widely seen as being desirable from the perspectives of urban renewal, and as an alternative to urban sprawl.<sup>108</sup>

The Ministry of the Environment's response to these concerns to date has been to grant exemptions from liability for site remediation to particular sectors, such as financial institutions,<sup>109</sup> and to effectively lower the standards required for clean-up. New contaminated site remediation guideless adopted in July 1996, for example, permit the use of site specific 'risk based' standards for site remediation.<sup>110</sup> These allow the remediation of sites to a level that is less rigorous than the standard of restoration to background levels of contamination required in the Ministry's original 1989 guidelines.

A number of stakeholders, including environmental organizations, have argued over the past few years that the Ministry needs to follow the approach being taken by a number of other provinces, such as British Columbia,<sup>111</sup> and adopt an comprehensive approach to this problem. This would deal with the issues of clean-up standards, the

funding of orphan site remediation, the assignment of liability, and the establishment of a publicly accessible registry of contaminated sites in the province, in an integrated manner.<sup>112</sup>

## **Recommendations**

29. The Ministry of the Environment should adopt a policy on the allocation of liability for the costs of site remediation, reflecting the following principles articulated for the Law Reform Commission on Canada in 1990:

- the protection of public health and welfare and the environment;
- the orderly, efficient and effective remediation of environmental degradation;
- the prevention and deterrence of future contamination;
- the promotion of compliance and self-regulation;
- provision of incentives for environmental protection;
- requirement that polluters pay in order to protect the public purse;
- the equitable imposition and allocation of liabilities;
- the avoidance of unjust enrichment or deprivation;
- clarity and precision in defining responsibilities; and
- sufficient flexibility and discretion to allow regulators to address a wide range of situations.<sup>113</sup>

30. Following the model of many U.S. states,<sup>114</sup> the province should establish an orphan site remediation fund. This should be supported through the allocation of some of the revenues from the hazardous waste charge which is proposed in Recommendation 23.

31. The Ministry of the Environment should review its approach to standard setting for contaminated sites. In particular, sites remediated on the basis of the 'site-specific, risk-based' model should not be permitted to be redeveloped for housing purposes. Prohibitions on other uses of lands remediated to 'risk-based' standards through which particularly vulnerable populations, such as children, might come into contact with contaminated soil, should also be considered. This would include such uses as schools and playgrounds.

32. Following the model of British Columbia and other provinces, the Ministry of the Environment should establish a publicly accessible registry of contaminated sites in the province. This should be accompanied by the establishment of clear rules requiring registration of histories of site contamination, and the clean-up measures undertaken, on title to land.

## **STRENGTHENING GOVERNMENT AND INDUSTRY ACCOUNTABILITY IN HAZARDOUS WASTE MANAGEMENT**

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 the bulk of these changes in June 1998, under the auspices of its regulatory review process.<sup>115</sup> 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 regulation of the management of hazardous wastes. 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.<sup>116</sup>

## **Recommendation**

33. An independent advisory committee regarding hazardous waste management should be established to provide independent advice, and review Ministry proposals on issues related to the management of hazardous wastes.

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 should include a commitment to providing regular state of the environment reports to the public. In addition, the practice of providing annual reports regarding environmental law enforcement activities by the Ministry, terminated in 1995, should be restored.

## **CONCLUSIONS**

Over the past four years, the Province of Ontario has experienced a significant growth in the generation of hazardous wastes from Ontario sources. The total quantities of waste manifested for off-site treatment and disposal in Ontario has risen from 1.5 million tonnes in 1994, to 2.1 million tonnes in 1997. The rate of growth in manifested waste quantities exceeds the rate of growth for the provincial in the same period by a factor of more than three to one.

The province is also experiencing a dramatic increase in international imports of hazardous wastes for 'recycling' and disposal, rising from 56,439 tonnes in 1993 to 246,000 tonnes in 1997. Ontario's International hazardous waste traffic is almost exclusively with the United States. This growth in waste imports may be a result of the strengthening of regulatory controls on the disposal of hazardous wastes in the United States, while the regulatory regime in Ontario has remained static or, in some cases, been weakened.

These trends indicate that the province's regulatory and information systems 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.

## SUMMARY OF RECOMMENDATIONS

1. The Waste Generator Registration process should be revised 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 annual reports should also include information on substances in storage and non-production waste generation.
2. A publicly accessible registry of pesticide container, waste oil and other sites dealing with 'subject' wastes operating under exemptions from the general requirements of the province's waste management regulations should be established, 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.
3. Industrial facilities regulated through the MISA program should be required to provide discharge monitoring data to the Ministry of the Environment in a standardized electronic format. This data should be made available to the public in a timely, easily accessible and user-friendly format.
4. The Ministry of the Environment should establish a requirement that municipalities provide annual reports to the Ministry regarding permitted and estimated total industrial discharges to their sewer systems. These reports should be made available to the public.
5. The Ministry of the Environment should establish a requirement that landfill operators report direct leachate discharges to municipal sewer systems to the Ministry. These reports should be made available to the public.
6. The Ministry of the Environment should establish a requirement that pesticide vendors report their sales of pesticides to the Province, including information on the types and quantities of pesticides sold, on a regular basis. Commercial applicators and municipalities should be required to report their use of pesticides on a similar basis. This information should be made available to the public.
7. The Ministry of the Environment should publish an annual report on the management of hazardous and other related wastes in the province of Ontario. This would include information on- and off-site management, discharges from MISA regulated industrial facilities, and industrial discharges to sewers. The data collected by the Ministry on the generation and fate of hazardous and other 'subject' wastes should also be made available to the public in a timely, comprehensive and user-friendly electronic format.
8. The Ministry of the Environment's regulatory oversight of hazardous and liquid industrial waste 'recycling' and 'processing' activities should be strengthened. 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;
9. Stringent approval, emission and operating regulatory standards for biomedical, liquid industrial and hazardous waste incinerators, and facilities using 'subject' waste as fuel, should be developed and adopted by the Ministry of the Environment.
  10. The Ministry of the Environment should establish pre-treatment standards for industrial discharges to sewers, as proposed in the original MISA program, and establish of pre-treatment requirements for landfill leachate discharges or transfers to municipal sewage treatment plants.
  11. Restrictions on the land disposal of hazardous wastes should be imposed by the Ministry of the Environment, beginning with a ban on the land disposal of liquid organic wastes.
  12. The use of hazardous or other 'subject' wastes as dust suppressants should be phased-out.
  13. The Ministry of the Environment should adopt a permanent prohibition of the use of waste oil as fuel in small space heating furnaces.
  14. A modernized definition of biomedical wastes should be adopted by the province. This should not permit the disposal of untreated blood or bodily fluids in sanitary sewers or septic systems.
  15. All waste pesticides should be included in the province's definition of hazardous wastes.
  16. The province should move towards the establishment of policy and regulatory system that controls the generation, use, handling and disposal of materials on the basis of their hazardous properties, regardless of whether they are a 'product,' 'recyclable material' or 'waste.'
  17. 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 full 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 acknowledgement by the Ministry prior to the commencement of operations;
    - confirmation of fire protection requirements prior to the commencement of operations;
    - regular reporting requirements, and public access to reports; and

- the reporting of the location and ownership of operating sites through the public registry proposed in Recommendation 2.
18. 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.
  19. 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 be integrated with the revised waste generator registration and reporting requirements proposed in Recommendation 1.
  20. The substances on the primary candidates substances list should be targeted for virtual elimination in the revision and modernization of the province's standards for hazardous air pollutants.
  21. The substances on the primary candidate substances list should be targeted for virtual elimination in review of other standards, including industrial and municipal water pollution control standards under the MISA program and the Model-Sewer-Use By-Law.
  22. Reductions in the use and generation of substances on the primary and secondary candidate substances lists should be sought through the pollution prevention planning program proposed in Recommendation 20.
  23. The Ministry of the environment should review all of its existing standards to consider the potential impacts of endocrine disrupting substances.
  24. The Ministry of the Environment should implement a charge on the generation of hazardous wastes on a per tonne basis. The revenues obtained through such a charge should be used to support programs and activities related to hazardous wastes and substances including 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.
  25. The revenues released through the support of these programs through the application of a hazardous waste charge proposed in Recommendation 23 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.
  26. A regulation should be adopted under the *Environmental Assessment Act* designating all proposals for permanent hazardous and other 'subject' waste disposal

facilities for review under the Act.

27. The *Environmental Protection Act* should be amended to require public hearings before the Environmental Assessment Board under the prior to the approval of hazardous waste handling or disposal systems or sites.
28. Provision should be made for intervenor funding to *bona fide* public interest intervenors in such hearings.
29. The Ministry of the Environment should adopt a policy on the allocation of liability for the costs of site remediation, reflecting the following principles articulated for the Law Reform Commission on Canada in 1990:
  - the protection of public health and welfare and the environment;
  - the orderly, efficient and effective remediation of environmental degradation;
  - the prevention and deterrence of future contamination;
  - the promotion of compliance and self-regulation;
  - provision of incentives for environmental protection;
  - requirement that polluters pay in order to protect the public purse;
  - the equitable imposition and allocation of liabilities;
  - the avoidance of unjust enrichment or deprivation;
  - clarity and precision in defining responsibilities; and
  - sufficient flexibility and discretion to allow regulators to address a wide range of situations.<sup>117</sup>
30. Following the model of many U.S. states,<sup>118</sup> the province should establish an orphan site remediation fund. This should be supported through the allocation of some of the revenues from the hazardous waste charge which is proposed in Recommendation 25.
31. The Ministry of the Environment should review its approach to standard setting for contaminated sites. In particular, sites remediated on the basis of the 'site-specific, risk-based' model should not be permitted to be redeveloped for housing purposes. Prohibitions on other uses of lands remediated to 'risk-based' standards through which particularly vulnerable populations, such as children, might come into contact with contaminated soil, should also be considered. This would include such uses as schools and playgrounds.
32. Following the model of British Columbia and other provinces, the Ministry of the Environment should establish a publicly accessible registry of contaminated sites in the province. This should be accompanied by the establishment of clear rules requiring registration of histories of site contamination, and the clean-up measures undertaken, on title to land.
33. An independent advisory committee regarding hazardous waste management should be established to provide independent advice, and review Ministry proposals on issues related to the management of hazardous wastes.

## ENDNOTES

- 1.Environmental Commissioner for Ontario, Annual Report 1997 (Toronto: ECO, 1998), pg.4.
- 2.Apogee Research, The Canadian Hazardous Waste Inventory (Ottawa: Environment Canada, 1995).
- 3.Joint Board, Ontario Waste Management Corporation Application: Decision and Reasons for Decision Ch-87-01, November 23, 1994, Table 1. The OWMC estimated total generation of all subject waste, including liquid industrial waste at 5.4 million tonnes/yr. An estimate of between 4-5 million tonnes/yr may be projected from the total of 2.1 million tonnes reported disposed of off-site in 1997 through the province's waste manifest system.
- 4.Environment Canada, The State of Canada's Environment (Ottawa: Minister of Supply and Services, 1991), pg.14-12.
- 5.Office of the Provincial Auditor, 1996 Annual Report (Toronto: Queen's Printer for Ontario, 1996), pg.120.
- 6.1996 Annual Report of the Office of the Provincial Auditor of Ontario, (Toronto: Queen's Printer for Ontario, 1996), pp.119-121.
- 7.Joint Board, OWMC Decision, pg.3-4, and note 12.
- 8.Joint Board, OWMC Decision, ch.3.
- 9.See, for example, B.McAndrew, "Recycle plant charged with toxic dumping," The Toronto Star, August 25, 1997.
- 10.S.D. Porteous/Solicitor-General Canada Organized Crime Impact Study: Highlights (Ottawa: Public Works and Government Services Canada, 1998), pg.ii.
- 11.Under this system, established in 1985, generators of 'subject' waste are required to register with the Ministry of the environment. However, they are not required to provide regular updates on their waste generation after initial registration.
- 12.Under the NPRI program, facilities that use or process more than 10 tonnes/yr of 178 designated substances must report their releases to the environment or transfers off-site in waste of these substances to Environment Canada on an annual basis, which releases the data to the public. Facilities were first required to report their releases and transfers under the program in 1993.
- 13.1996 Annual Report, pp.119-121.
- 14.The Joint Board, OWMC Decision, Ch.3.
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17. Second Report of Progress Under the COA, pg.9 reports a 25% increase in transfers of hazardous and liquid industrial wastes off-site for disposal recorded through the waste manifest system between 1994 and 1996.

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20. Figure corrected for 2-ethylehexyl Phtalate reporting error.

21. Corrected for chromium reporting error.

22. Corrected for chromium reporting error.

23. Environment Canada, NPRI 1994 Summary Report, Table 38.

24. Figures provided in The Globe and Mail, November 24, 1994, citing the Ministry of the Environment as source.

25. Ministry of Environment and Energy, "Distribution of Hazardous & Liquid Industrial Waste in Ontario," unpublished document provided to CIELAP, March 1997.

26. Environment Canada, Hazardous Waste Branch, Transboundary Movement Division, February 22, 1999.

27. Taking Stock: North American Pollutant Releases and Transfer: 1995 (Montreal: North American Commission on Environmental Cooperation, 1998), Table 7-1.

28. Resilog, December 1996, Vol.10, No.1.

29. Environment Canada, Hazardous Waste Branch, Transboundary Movement Division, February 22, 1999.

30. S. Casey-Lefkowitz, "Transboundary Movements of Hazardous Wastes in North America: A United States Perspective," paper delivered at CIELAP Workshop on the Transboundary Movement of Hazardous Wastes In North America, October 1997.

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32. Controlling Industrial Discharges to Sewers (Toronto: Ministry of the Environment, 1988, pg.1.; Ministry of Environment and Energy, The MISA Industrial Program (Toronto: January 1994).

33. See, for example, Joint Board, OWMC Decision, pg. 6-26, Schedule G.

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39. NPRI 1994 Summary Report, Tables 38 and 39.
40. Winfield, Hazardous Waste Management in Ontario, Table IV-10.
41. Joint Board, OWMC Decision, Table 1.
42. The Hon. N. Sterling, Minister of the Environment, Response to Order paper No 218, Question 2087, Filed August 25, 1997, by D. Augustino, M.P.P.
43. The Hon. N. Sterling, response to Order Paper No. 218, Question No. 2086, filed by D. Augustino, M.P.P., August 25, 1997.
44. Pers. Comm., Renato Legati, Senior Environmental Manager for Canadian Operations, Safety-Kleen Canada Ltd., March 25, 1997.
45. Ministry of Environment and Energy, Responsive Environmental Protection: Technical Annex (Toronto: MoEE, August 1996), pg. 77.
46. See, for example, Regulation 501/92.
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48. M. Winfield and G. Jenish, Ontario's Environment and the 'Common Sense Revolution': A Third Year Report (Toronto: CIELAP, 1998), Figure (i)b.
49. Northing Left to Cut: A field report on activities of the Ontario Ministry of Environment and Energy (Toronto: Ontario Public Service Employees Union, January 1997), Figure 9.
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51. Responsive Environmental Protection: A Consultation Paper (Toronto: Ministry of Environment and Energy, July 1996).
52. EBR Registry No. RA8E0023 - Draft Waste Management Regulation, June 2, 1998.
53. These exemptions were adopted in March 1998. See EBR Notice RA7E0012.P and R. Nadarajah and M. Winfield, Submission to the Ontario Ministry of Environment and Energy Re: EBR Notice RA70012.P Amendments to Regulation 347 (Toronto: Canadian Environmental Law Association and Canadian Institute for Environmental Law and Policy, November 1997).
54. For a detailed commentary on these proposals see R. Nadarajah, T. McClenaghan, and M. Winfield, Submission to the Ministry of the Environment RE: EBR Notice RA8E0023 Draft Waste Management Regulation (Toronto: Canadian Environmental Association (Brief #352) and Canadian Institute for Environmental Law and Policy (Brief # 3/98), September 1998).



55. See, for example, "Environmental Management Agreement among Dofasco Inc., Ministry of the Environment, and Environment Canada," January 8, 1998.
56. OFM, Protecting the Public and Environment by Improving Fire Safety at Ontario's Recycling and Waste Handling Facilities.
57. The Ministry's proposals include two minor positive revisions. These are the introduction of a requirement for semi-annual reporting on on-site disposal of 'subject' wastes under the Waste Generator Registration System, and the removal of the general exemption for waste agricultural pesticides from the definition of hazardous waste.
58. EBR Registry No. RA78E0018.P - RA7E0026.P, December 30, 1997.
59. EBR Registry No. PAE0029 - 1998 Model Sewer Use By-Law. June 14, 1998.
60. Environmental Commissioner for Ontario, Annual Report 1997 (Toronto: ECO, 1998), pg.4.
61. Controlling Industrial Discharges to Sewers (Toronto: Ministry of the Environment, 1988).
62. An interim ban on the approval of new waste oil burning space heaters was adopted by the Ministry of the Environment in March 1998.
63. Association of Municipal Recycling Coordinators, Analysis of Household Hazardous Waste: Reduction and Management Study Project Two: Municipal HHW Composition, Cost Analysis & Management Options Study/Final Report (Guelph: AMRC and National Household Hazardous Waste Task Force, February 1996), pg.1.
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65. Ministry of Environment and Energy, Status Report on Ontario's Air, Water and Waste (Unpublished, draft released to the public in January 1997), pg.91.
66. Report on Special Waste Generation by the Non-Industrial Sector in Ontario (Toronto: Ontario Waste Management Corporation, 1988), Table 1.
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69. See R.Nadarajah and M.Winfield, Comment on MoE's Proposal for Standardized Approval Regulations and Approval Exempting Regulations (EBR Registry No.RA8E0008.P (Toronto: CELA and CIELAP, March 1998), and R.Nadarajah, T.McClenaghan and M.Winfield, Submission to the Ministry of the Environment RE: EBR Notice RA8E0023 Draft Waste Management Regulation (Toronto: CIELAP and CELA, September, 1998).
70. See also the Recommendations in 'Democracy' re: Standardized Approvals.
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72.M.S. Winfield and J.Rabantek, Putting the Environment in Green Industry Strategies: The Role of Environmental Industries in Restructuring for Sustainability (Toronto: CIELAP, April 1995), pg.9 and notes 53-55.

73.Under the Toxics Release Program, established in 1987, facilities that use or process 10 tons or more of over 600 substances are required to report their releases, on-site disposal, and transfers of these substances to the public.

74.See: M.Becker and K.Geiser, Evaluating Progress: A Report on the Findings of the Massachusetts Toxic Use Reduction Program Evaluation (Lowell: Toxics Use Reduction Institute, March 1997); and M.Aucott, D.Wachspressa and J.Herb, Industrial Pollution Prevention Trends in New Jersey (Trenton: New Jersey Department of Environmental Protection, December 1996).

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80.Becker and Geiser, Evaluating Progress, pg.4.

81.Ibid., pg.iv.

82.Ibid., iv.

83.*Great Lakes Water Quality Agreement of 1978*, Annex 12, section 2.

84.International Joint Commission Fifth Biennial Report on Great Lakes Water Quality: Part II (Washington, Ottawa and Windsor: IJC, 1990), pg.7.

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118.See Ford, Macdonald and Winfield, "Who Pays for Past Sins," pg.33.