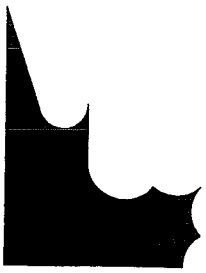

PROGRAM FOR ZERO DISCHARGE

A PROJECT OF THE

CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW AND POLICY

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SUBMISSION TO THE INTERNATIONAL JOINT COMMISSION

on behalf of the

Program for Zero Discharge

a project of the

Canadian Institute for Environmental Law and Policy

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Introduction to the Program for Zero Discharge

The Program for Zero Discharge is a collaborative effort of a number of organizations which understand and believe in the importance of achieving the reduction and eventual elimination of the discharge of persistent toxic chemicals into the Great Lakes ecosystem. In early 1988, the Canadian Institute for Environmental Law and Policy (CIELAP) of Toronto, Ontario and the National Wildlife Federation (NWF) of Ann Arbor, Michigan jointly designed a multi-year project to develop a comprehensive and coherent strategy for achieving the goal of zero discharge. The project, called Program for Zero Discharge, received funding from the Canadian Donner Foundation, Gund Foundation, Joyce Foundation, Laidlaw Foundation, Mott Foundation, Ontario Ministry of the Environment and Environment Canada and commenced in December of 1988.

In addition to the CIELAP and NWF, a number of other organizations will be participating in the Program, including Great Lakes United and the Institute on Canada and the U.S..

The Program has both research and outreach components to it. The research component has two primary foci that are intertwined. The first, to be coordinated by NWF, is the development of model or (ideal) water quality standards and regulations for State, Provincial and Federal governments. Water quality standards remain the foundation of these governments' water pollution control efforts. NWF's model standard will be based on what it takes to eliminate toxins from the Great Lakes, rather than the current approach of most jurisdictions, which is to define "acceptable" concentrations of toxic pollution based on minimizing impacts in the immediate vicinity of the discharges.

The second part of the Program's research component, to be conducted by CIELAP, will be to recommend how to develop a new generation of regulatory mechanisms for the basin -- a source reduction strategy. The theme of this effort is to change environmental regulation from "managing" pollution from toxic substances to finding a mix of regulatory strategies that will "prevent" the creation of toxic by-products, residues and wastes.

The Program for Zero Discharge also has a public dissemination and outreach component. The purpose of this component is to establish a two-way conduit to solicit ideas and input from the public and disseminate research findings and recommendations. Input will be sought and information solicited through a variety of means, including workshops, fact sheets and articles. Ultimately, a "Citizen's Guide to Zero Discharge" will be published which will give citizens the tools to advocate the adoption of the recommendations by governments.

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1. Introduction

The goal of zero discharge of persistent toxic chemicals is the priority environmental goal for those living in the Great Lakes basin ecosystem. Zero discharge is one of the fundamental goals of the Great Lakes Water Quality Agreement. Its importance underlies the establishment of the Program for Zero Discharge, a binational project of the Canadian Institute for Environmental Law and Policy (CIELAP) and the Great Lakes Natural Resource Center of the National Wildlife Federation. This submission is on behalf of CIELAP, with the National Wildlife Federation making a separate, albeit complementary submission.

The first few sections of this submission will provide an overview to the ecological and legal basis to the goal of zero discharge, with a review as to its public constituency. The second part examines the suggested and some competing definitions of the zero discharge goal. Part three then examines the legal and policy mechanisms to achieve zero discharge.

2. The Ecological Basis for Zero Discharge

Zero discharge is recognized as the only long-term appropriate response to the problem of persistent toxic chemicals owing to the nature of these chemicals, their known impacts and to the need for a preventive approach for those chemicals where an full understanding of their impacts is difficult, if not impossible to understand.

2.1 The Nature of Persistent Toxic Chemicals

Persistent toxic chemicals pose severe threats to the Great Lakes ecosystem because of the very nature of these chemicals, and in particular, their persistence, ability to bioaccumulate and to cycle through the environment. More particularly, these characteristics may be described as follows:

(a) **Persistence:** The ability of some substances to build up to toxic levels relates to their "persistence", - their resistance to breakdown by physical, chemical, or metabolic processes. Persistent substances include elements (substances that cannot be broken down any further by environmental processes) and complex, stable organic compounds, such as PCBs. Once discharged into the environment, persistent toxic substances can accumulate for a relatively long period of time. Persistence may also refer to immobility of a chemical in one part of the environment, such as lead in sediments. A substance that is resistant to breakdown in one component of the environment but not in another, where it would readily be decomposed, must still be considered persistent.

(b) **Bioaccumulation:** Persistent toxic substances can build-up or bioaccumulate in the biological component of the environment. For substances that are more readily soluble in fat than in water, ingestion can result in the substance accumulating in an exposed organism's fatty tissues. When this organism is then consumed by a predator, which also consumes other such organisms, the concentration is magnified, (though a process known as biomagnification) so that at the top of the food chain, concentrations in tissues can be several orders of magnitude greater than the concentration in water. For example, those consuming fish could ingest more chemicals in one meal than years of drinking water from the same lake. Moreover, even if exposure to chemicals is stopped, the processes of bioaccumulation and biomagnification may still cause considerable harm.

(c) **Cycling:** Different forms of matter and energy move through different components of the environment: this is known as "cycling." Pollutants also cycle through the environment. Pollutants emitted into air may be deposited on land or in waters; substances on land or in soil can leach out or be released by erosion and end up in water or they can evaporate into the air, while many substances in water can evaporate into the air as well. The cycling of toxic chemicals is evident in the Great Lakes basin. Although the lower lakes of Erie and Ontario are usually considered more polluted than the upper lakes, because of cycling and non-point source contributions, all the lakes are affected by toxic contaminants. For example, it has been estimated that 87 percent

of the lead, 68 percent of the chromium, and 80 percent of the PCBs entering Lakes Superior every year are deposited from the air. Erosion and run-off contribute a significant amount of pesticides and heavy metals to the lakes. In effect, the waters of the Great Lakes act as sinks or depositories for persistent toxic chemicals in the basin.

2.2 Ecosystem and Human Health Impacts

The insidious nature of persistent chemicals is uncovered when the ecological and human health impacts of these chemicals are made apparent. While there is much yet to uncover about the ecosystem effects of toxic contamination, there is a growing catalogue of impacts on fish, wildlife, and humans in the Great Lakes.

(a) Impacts on Fish

Fish are "sentinels sending out a warning about the presence of dangerous chemicals in the environment." In recent years, scientists have identified a range of effects on Great Lakes fish, including: mortality of Lake Trout fry; lower survival of Lake Trout eggs; disease frequency; reproductive failure; and increased rate of hyperplasia.

One of the most disturbing trends observed is the increase of fish tumours. Figures such as 30 percent of brown bullhead in the Black River of Ohio having liver cancer and 25 percent with skin cancer are echoed throughout the basin, primarily in areas of concern, including Hamilton Harbour, Saginaw Bay, Welland, and the Buffalo River. Well-known examples include thyroid hyperplasia in Great Lakes coho salmon; gonadal tumours in fish found at the mouth of the Rouge River at Detroit with a tumour rate of 100 percent in older male carp; and lip papillomas in 40 permit of the white

suckers in southern Lake Huron. Tumours appear most often in bottom-feeding fish from areas within the basin with heavily contaminated sediments. One study found fish from the polluted Fox River near Green Bay had a significantly higher frequency of tumours than the same species in a non-polluted control lake.

(b) Impacts on Wildlife

Like many aquatic organisms, wildlife on the Great Lakes have been affected by toxic contamination. Wild mink, once plentiful in and around Lake Ontario, have been found to have severe reproductive problems, probably owing their diet of polluted Lake Ontario trout. They are now virtually non-existent within eight kilometres of the New York shore of the Lake. Populations of other Lake Ontario wildlife that lives off fish, such as bald eagles and osprey, have also suffered such that they are now rarely found around the lake.

A variety of bird species have been found to have a number of problems owing to contamination; they include eagles, herring gulls, double-crested cormorants, and the common tern from the lower lakes. Not only have their populations periodically collapsed but, in some cases were not able to lay eggs, in others the nestlings were deformed. Impacts that have been recorded include reproductive failure, abnormal nesting behaviour, and congenital anomalies.

(c) Human Impacts

Some 26 million people depend on the Great Lakes for drinking water. Since the early 1970s, minute quantities of toxic chemicals

have been found in drinking water in various parts of the basin.

An important food source containing toxic substances in the basin is fish. Governments have issued advisories warning not to eat some fish and to limit consumption of others species of fish, with special advisories to sensitive populations, such as pregnant women. A number of studies, for example, have related maternal consumption of fish contaminated with PCBs and other chemicals to several health and behaviourial indicators in newborn babies, including lower birth weights, premature birth, and certain other behaviourial defects. Consumption advisories urge pregnant and nursing mothers, women of child-bearing age, and children to avoid eating Great Lakes fish altogether.

The relationship between increasing numbers of fish tumours in the basin and the threat of increased human cancers has not been studied and thus it is premature to draw conclusions. However, the increased incidence of tumours in fish sends strong signals concerning ecosystem health, and certainly more study is warranted so to understand the implications for human health. The need for such studies is particularly strong in light of the fact, because of the potential for bio-accumulation, many areas of the basin already have higher-than-average levels of cancer mortality for both Canada and the United States.

In 1985, the Science Advisory Board's Human Health Effects Committee reviewed the concentrations of 36 toxic chemicals found the Great Lakes fish or water. They found exposure "levels of concern for 2 chemicals in fish and 10 in water, but there were

insufficient monitoring data for 27 chemicals found in fish and 14 in water to determine an exposure level of concern.

These disparate pieces of information point to the fact that the presence of toxic contamination in the Great Lakes basin is having an effect on the health and functioning of the ecosystem in a number of locations. Such information gives glimpses of further ecosystem harm unless appropriate action is taken.

2.3 The Uncertain Science of Persistent Toxic Chemicals

The goal to work toward zero discharge is justified on the basis of what the known impacts of these are in the Great Lakes ecosystem. However, before these impacts are briefly discussed, it is important to recognize that there is still relatively little known about these chemicals in the ecosystem. A comprehensive understanding of their impact may never be known. Zero discharge is important, therefore, not only for what is understood, but also because of the virtual impossibility of ever having a complete information base of the adverse consequences of these chemicals in the ecosystem.

Toxic contaminants are difficult to understand for a number of reasons. Some of these reasons relate to factors taken into consideration in understanding:

(a) **toxicity (acute v. chronic effects);** Traditionally, "acceptable" levels of toxic pollutants were determined by understanding their "acute" effects. Tests in which aquatic life and animals are exposed to is controlled and increasingly higher doses of a substance are given to determine their lethal dose and dose levels at which observable effects occur (the "threshold level"). For persistent toxic contaminants, however, chronic effects - those effect which manifested by exposure to these chemicals in low concentrations over a long period of time - are also important.

(b) **what happens to the chemicals once released into the environment (cumulative, additive and synergistic effects):** There is little is known about the combined and synergistic effects of the cocktail of chemicals present in Great Lakes water. Similarly, data on additive and antagonistic effects are also lacking.

(c) **and multi-pathways:** The relationship between effluent concentrations, the traditional regulatory approach to water quality, and the ultimate manifestation of effects is not clear because of the residual environmental concentrations and the multiple-exposure pathways of many substances. Thus, looking at single-medium regulatory objectives may underestimate the risks associated with a particular concentration of a particular chemical.

3. Zero Discharge as a Regulatory Goal

Usually, the basis of the zero discharge goal is attributed to the Great Lakes Water Quality Agreement. However, its origins actually date back to the turn of the century. Moreover, since its inclusion in the Great Lakes Water Quality Agreement, the goal has been adopted and re-affirmed by national, state and provincial governments.

3.1 Historical Origins

The basis of many bilateral obligations in the Great Lakes ecosystem stems from commitments made in the Boundary Waters Treaty of 1909. Article IV of that Treaty states:

> It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.

One of the first references submitted to the International Joint Commission, established under the Treaty, required the Commission to investigate and report on boundary water conditions both in the

Great Lakes basin and elsewhere along the international boundary. In 1918, the Commission issued a report calling for urgent action, including the halting of all industrial discharges into the basin. The report recommended that the two national governments confer jurisdiction upon the Commission to regulate and prohibit transboundary pollution. A draft convention was thereupon submitted which would have outline the strategy for implementing the Commission's recommendations. The draft convention was soon thereafter rejected by the governments.

The zero discharge goal in the Great Lakes Water Quality Agreement owes much to the adoption of the goal under the U.S. Clean Water Act in 1972. Section 101(a) [s. 1251] of that Act states:

> The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order achieve this objective, it is hereby declared that, consistent with the provisions of this Act,
>
> (1) it is the national goal that the discharge of pollutants into navigable waters be eliminated by 1985;

Until 1972, however, federal law assumed that discharge of wastes into U.S. waters was assumed a legitimate means of waste disposal. Discharges were permitted to the extent ambient standards were not violated.

In 1972, however, amendments to the Water Quality Act fundamentally altered a number of assumption with respect to water quality regulation. Most importantly, Congress declared that the "use of any river, lake, stream or ocean as a waste treatment system is unacceptable." In other words, there would no longer be

the right to pollute the nation's waters. In accordance with this principle, all further discharges would be prohibited unless such discharges were allowed through the NPDES permit system. The intent of the NPDES permit system was to develop uniform, technology-based effluent standards. These standards are supplemented by water quality standards. Both the technology-based effluent and water quality standards are designed to be interim measures until the zero discharge policy goal of the Act is achieved.

The zero discharge declaration in U.S. water law was justified for a number of reasons. These reasons include: the scientific uncertainties in attempting to determine "acceptable" ambient concentrations; the inherent difficulty and administrative burden for regulators in determining levels of discharge were injurious; the disparity of standards among states; and finally, the problems of enforcing ambient standards.

3.2 The Great Lakes Water Quality Agreement

In 1978, the signatories of the Great Lakes Water Quality Agreement sent the unequivocal message that the discharge of persistent toxic substances will no longer be tolerated owing to the ecological harm that results from the use and disposal of these chemicals. It is clear that the Agreement was meant to **prevent** the further toxic contamination of the Lakes. The strength of the message sent out by the zero discharge commitment must be seen in light of the relatively little information which was available on the true adverse impacts of persistent toxic chemicals. As one IJC report concluded:

> many more toxic chemicals and low ambient concentrations of chemical mixtures threaten the health of the ecosystem to an extent and in ways that were not realized in 1978, and many are not adequately addressed by existing monitoring and control programs;

It is also of interest that the zero discharge goal of the U.S. Clean Water Act has been severely criticized over the years as being excessive, technologically impossible and economically unpalatable. Despite this express and at times extreme criticism, the goal was nevertheless expressly incorporated into the Great Lakes Water Quality Agreement in 1978.

Article II of the Agreement establishes a number of policy commitments or a hierarchy of obligations. The first paragraph establishes the commitment to eliminate or reduce to the maximum extent practicable the discharge of all pollutants.

The second paragraph mandates a special, more stringent, regime pertaining to toxic substances, namely, the discharge of toxic substances in toxic amounts shall be prohibited. Further, for persistent toxic substances, the discharge of all persistent toxic substances to the Great Lakes ecosystem shall be "**virtually eliminated**". The qualifying statement, "to the maximum extent practicable", found in the general commitment to eliminate all discharges, is not present in the obligations pertaining to toxic substances. The commitments to eliminate the discharge persistent toxic substances is to be strived for in a much more diligent way than for other pollutants.

The clear intention of the Great Lakes Water Quality Agreement is that the virtual elimination goal is the overriding goal since

many provisions under the Agreement are considered "interim", pending its achievement, including:

* the Specific Objectives, in accordance with the Supplement to Annex 1; and
* the Areas of Concern, Critical Pollutants and Point Source Impact Zones, in accordance with Article IV and Annex 2.

Moreover, the inclusion of Annexes 13 (pollution from non-point sources), 14 (contaminated sediments), 15 (airborne toxic substances), 16 (pollution from contaminated groundwaters), among a number of other provisions, in the 1987 Protocol to the Agreement suggests that the virtual elimination goal refers to more than simply direct "discharges"; instead there is a clear intention that the Agreement applies to all inputs, direct or otherwise. The key to the goal is not the discharge to any media, but the availability of such chemicals to be released to affect ecosystem health.

Finally, while Article II commits the Parties to the virtual elimination of persistent toxic substances, Annex 12 mandates that <u>regulatory programs and strategies be adopted in the philosophy of zero discharge</u>. Annex 12, therefore, provides a direct dictate to the Parties' regulatory strategies - there shall be no more discharges of persistent toxic chemicals. Whereas virtual elimination assumes there will always be some incidental discharges through natural and accidental releases, the zero discharge direction for regulatory strategies do not provide any tolerance for the discharge of any persistent discharges. Zero means zero.

3.3 Other Support for the Goal

The Great Lakes Water Quality Agreement does not stand alone in the express and strong acceptance and commitment to the zero discharge goal. The Great Lakes Toxic Substances Control Agreement, signed in May of 1986 by the eight Great Lakes states and in 1988 agreed to by the two provinces, commits the signatories to actions consistent with the Great Lakes Water Quality Agreement. Principle IV states as follows:

> The signatory States commit to continue reducing toxins in the Great Lakes Basin to the maximum extent possible. Such actions shall be consistent with the Federal Clean Water Act goal of prohibiting the discharge of toxic pollutants in toxic amounts, as well as the Great Lakes Water Quality Agreement's aim to "virtually eliminate" the discharge of all persistent toxic substances.

Section 118 of the 1987 amendments to the U.S. Clean Water Act states that the U.S should "seek to attain the goals embodied in the Great Lakes Water Quality Agreement of 1978 with particular emphasis on goals related to toxic substances."

The Municipal-Industrial Strategy for Abatement (MISA) and the Clean Air Program (CAP) in Ontario both expressly have as their aim the virtual elimination of persistent toxic substances.

4. The Public Constituency for Zero Discharge

The impacts of toxic contamination of the Great Lakes have made people aware that long-term, sustainable strategies are urgently needed to address the problem. The objective on top of the list is invariably zero discharge. An excellent example of this voice was the hearings conducted by Great Lakes United prior to the

renegotiation of the Great Lakes Water Quality Agreement in 1987. The resulting report, Unfulfilled Promises, noted: "The public believes the contamination of the Great Lakes is so severe and that so little is know about the long term health effects of toxic chemicals in the ecosystem, that zero discharge of persistent toxic substances is the only reasonable course of action." The Report further stated that: "A seemingly endless parade of testifiers stressed the need to achieve zero discharge including representatives of labour, environmental groups, the federal governments, municipalities, almost every state and provincial water quality agency and even industry."[p. 50]

Similar sentiments were voiced all around Lake Ontario in the summer of 1988 when the Lake Ontario Organizing Network (LOON) held public meetings in over a dozen lake communities. In the Citizens' Declaration on Lake Ontario, it was declared that "The goal of Zero Discharge... be implemented for Lake Ontario as soon as possible."

Moreover, in recent survey of 600 Lake Ontario resident, a Decima poll, commissioned by Pollution Probe, 90% of the residents believed that the governments were acting too slowing in implementing zero discharge. Moreover, over 80% of the residents thought that the goal of zero discharge could be realized within a 10 year timeframe.

The goal of zero discharge is slowing capturing the imagination of all sectors of society - labour, industry, local governments, the public - as a comprehensive, long-term response to a problem which, in different ways, affects all basin interests.

Indeed, a number of industrial sectors have already committed to a zero discharge strategy.

5. What is Meant by Zero Discharge?

Persistent toxic chemicals remain the most significant threat to the Great Lakes ecosystem. It is in response to the nature of these chemicals, and their known and suspected impacts, that the goal of zero discharge has been formulated and effort invested to ensure for its implementation. But what is meant by zero discharge?

5.1 Proposed Definition - Zero Discharge as Meaning the Elimination of all Inputs of Persistent Toxic Chemicals

Zero discharge means the elimination of all inputs of persistent chemicals, whether it be from direct discharges into waterways or the air, indirect discharges such as agricultural and urban run-off, or inadvertent discharges, such as from leaking landfills or reactivation of contaminated sediments. The guiding assumption behind this definition is that all sources of persistent toxic chemicals must be eliminated so that there will be no opportunity or availability for the chemicals to enter the ecosystem. Zero discharge, therefore, necessarily implies zero availability.

It is recognized that this definition addresses those direct and indirect inputs by humans - there would still be toxic chemicals being discharged into the ecosystem by non-human sources and beyond immediate control (such as accidental and illegal discharges). The adoption of this ambitious and all- encompassing

definition of zero discharge is necessary to virtually eliminate the inputs of toxic chemicals into the Great Lakes ecosystem. It is also recognized that there are a number of chemicals which are simply so detrimental to ecosystem health that their manufacture, use, and disposal in the Great Lakes are no longer acceptable.

5.2 Competing Definitions

A number of alternative definitions have been proposed for the zero discharge goal. It may be worthwhile to very briefly examine these competing definitions and explain why they are inappropriate.

(a) Zero Discharge as Meaning "Best Efforts" to Toxic Discharge Reductions

Zero discharge does not mean that it is sufficient that persistent toxic chemicals be eliminated only to the extent immediately practical. The zero discharge concept is rooted in ecological need, not technological practicality or economic feasibility. Certainly, having the technology and economic resources are important in the achievement of the goal, that is why it is recognized the goal cannot be achieved overnight - there must be interim steps along the way. On the other hand, unless there are technology forcing mechanisms, technology will never develop and economic resources will never be allocated.

(b) Zero Discharge as Meaning Tolerable Impacts or Risks Associated with the Discharges

Zero discharge does not mean that the goal is achieved where is tolerable impacts related to the discharge of persistent toxic discharges are identified (sometimes referred to as "zero impact").

As noted above, it is virtually impossible at this point in time to identify what are the precise impacts occasioned by particular discharges or what are the long term and chronic impacts of these chemicals.

Certainly research monies should be devoted to understanding the long-term, cumulative and synergistic impacts of these chemicals; but reduction and elimination efforts should not have to wait until such studies have come to inescapable conclusions as to what the exact impacts on particular receptors are - that information may never be available, and if it does become available, irreparable harm may result in the interim. Policy-makers in this regard should err on the side of caution.

Further, this interpretation was rejected in the 1987 Protocol to the Great Lakes Water Quality Agreement where it was specifically stated that the Specific Objectives in Annex 1 are interim objectives for persistent toxic substances.

"Zero impact" is at times expressed in biological terms such as having Great Lakes fish that can be consumed in unlimited quantities. Certainly this is a worthy goal. However, it still begs the question of at what threshold of contamination is permissible (for instance, at what level can people eat fish in unlimited quantities.) Hence, while it is a worthy goal, it is simply an interim one moving toward the ultimate goal of zero discharge.

(c) Zero Discharge as No Detectable Concentrations of Persistent Toxic Chemicals

Zero discharge does not connote some specified level of contamination or some specific concentration of pollutants. Similarly, it does not means that reductions should maintained at the level of detection. The zero discharge goal clearly focuses upon the elimination of sources and not legitimating any specific level of toxic inputs. Moreover, ecosystem harm may still result at many orders of magnitude below the levels of detection for some chemicals. Further, this interpretation of zero discharge becomes simply too complicated in attempting to determine appropriate levels of concentration or appropriate detection methodologies. Some persistent toxic chemicals may cause adverse effects at any level of concentration, such as genotoxic chemicals, thus suggesting that zero means zero.

6. Implementing the Zero Discharge Goal

The goal of zero discharge has been recognized and committed to for sometime now; what is missing, and very much needed, is a coherent, comprehensive plan of action to realize the goal. The plan must be multi-dimensional - involving educational, legal, policy, economic actions; and it must include the involvement of all constituencies - industry, governments, and the public. The IJC Third Biennial Report of the IJC expressed this point when it stated a "broadly based, comprehensive strategy is required to deal with the multiple problems of toxic substances in the Great Lakes Basin Ecosystem." [p. 19]

The Program for Zero Discharge does not propose to design this

entire package. Instead, it focuses on regulatory reforms which would become an integral and extremely important aspect of this action plan. In this context, the Program for Zero Discharge seeks to implement the goal with existing regulatory structures and regimes, for example, through model water quality standards. The National Wildlife Federation submission discusses at length the failure of basin jurisdictions to implement the Great Lakes Water Quality Agreement. The Canadian Institute for Environmental Law and Policy will be focussing on alternative strategies to achieve zero discharge, in particular, source reduction or pollution prevention.

6.1 What is Pollution Prevention?

Existing environmental protection appproaches imposed by governments are medium specific and focus on pollutants and wastes after they have been generated. In order to achieve zero discharge, alternative legal approaches are needed which seek to prevent the creation of pollutants rather than simply manage them. This alternative approach is often referred to as "pollution prevention" or "source reduction".

"Pollution prevention" refers to practices that substantially reduce or prevent the generation of toxic pollutants at their source. Substantial reduction in the generation of pollutants means that techniques for dealing with pollutants after they are created are de-emphasized. While recycling, reuse, waste treatment will continue to play a role, source reduction and pollution prevention is the most desirable option and at the top of waste elimination hierarchy.

Pollution prevention, to be effective, must be directed at both point sources (direct discharges) and non-point sources (run-off, leaching landfills, contaminated sediments) and at emissions into all environmental media.

Pollution prevention methods focus on process and materials changes that prevent pollution. These are often more efficient processes which save raw materials as well as substantially reducing pollutants that would otherwise require control treatment or disposal. Important pollution prevention methods include:

- end product redesign or reformulation;
- process modifications;
- material substitution;
- use of more modern or efficient equipment;
- good housekeeping practices and;
- in-process recycling.

6.2 Governmental Failure to Implement Pollution Prevention

In the summer of 1989, CIELAP undertook a "Pollution Prevention Survey". Over forty in-depth questionnaires were sent to all air, water and waste management governmental agencies in the Great Lakes basin. The questionnaire explored what laws and programs were in place dealing with pollution prevention, human and financial resources devoted to the concept, among many other issues. This survey and analysis will be published in November of 1989. However, the primary results are quite clear. Goverments of the Great Lakes basin have not implemented the pollution prevention

approach.

At the U.S. federal level, pollution prevention is not the governing regulatory approach. Waste reduction is, in principle, the goal of federal policy for hazardous waste, as outlined in the 1984 amendments to the Resource Conservation and Recovery Act. In practice, however, the requirements of the U.S. federal program "give equal treatment to off-site recycling and treatment" as to waste reduction and there are no incentives to encourage source reduction over these waste management techniques. Apart from waste management, other statutes governing air and water pollutants do not have source reduction as their policy component.

In 1988, the U.S. EPA created an Office of Pollution Prevention to coordinate multi-media efforts toward source reduction. In January of 1989, the Administrator of the EPA proposed to commit the Agency to pursuing a preventive program, that is, a program to reduce or eliminate the generation of potentially harmful pollutants. 2% of regional research budgets will be allocated to pollution prevention. These are significant actions, but there is nothing that EPA is doing that will require the use of pollution prevention techniques. These programs encourage industries to go to these techniques but do not substitute a reformed regulatory process for existing single-media control programs.

Several U.S. states have adopted pollution prevention regulatory programs. In the Great Lakes, most states support pollution prevention in principle; however, no state has a

comprehensive pollution prevention regulatory program. Of the programs that do exist, many are limited in their scope and are voluntary in nature. Most offer technical assistance, information or financial incentives to industry as a way of encouraging pollution prevention. But significant barriers to prevention remain.

In Canada, the federal government claimis it has a policy supporting prevention but there is no evidence that it gives any priority to pollution prevention in its environmental statutes or programs. While the province of Ontario has been more progressive in this regard, with incentive programs encouraging prevention, it too lacks a mandated pollution prevention program or a toxic use reduction target. Its Municipal-Industry Strategy for Abatement (MISA), while on paper seeking virtual elimination, calls for technologically based standards, an example of a pollution control, and not pollution prevention strategy. In addition, it is not a cross-media program.

Despite the Science Advisory Board's recommendation in its 1987 Report to the Commission to adopt a "anticipate and prevent" strategy, it is fair to say that the Great Lakes are in fact lagging behind in developing pollution prevention strategies directed to achieving zero discharge.

7. Toward Zero Discharge: The Need for a Plan of Action

If progress is to be made on achieving zero discharge, there is need for immediate action by all levels of government. Such

action should be directed by the principles outlined below. Although the governments are vested with the responsibility to implement the Great Lakes Water Quality Agreement, the IJC also has a role to play to achieve the goal.

7.1 Guiding Principles

The Program for Zero Discharge has developed three guiding principles in the development of a zero discharge action plan. These three principles are as follows:

(a) The Need for a Multi-Media Approach

The first principle is that all sources of persistent toxic chemicals must be addressed, irrespective of whether their initial point of entry or discharge into the ecosystem is into the air, ground, or waterways. This multi-media approach takes into account the total environmental exposure from chemicals by addressing all sources of certain chemicals and all releases of those chemicals. Hence, from a regulatory point of view, both point and non-point sources of persistent toxic chemicals must be taken into account.

(b) The Need for Total Loadings Reductions

Another principle for the Program for Zero Discharge is that it is necessary to move away from concentration based regulatory controls to control which aims to reduce overall loadings of persistent toxic chemicals. There are a number of initiatives in the basin which are undertaking mass balances in order to identify the sources, quantities, pathways and sinks for toxic chemicals in a particular ecosystem. Such efforts are to be encouraged even though it must also be recognized that efforts to reduce loadings

should not be delayed until mass balances for local or regional ecosystems are completed. There is enough known at this point of time to commence an effective reduction and elimination strategy.

(c) The Need for Timetables and Schedules

As mentioned above, the zero discharge goal is not new. Despite this express and necessary commitment, there has been only sporadic progress toward its realization. What is urgently in need, therefore, is a concrete strategy which includes timetables and schedules as to when the goal will be reached for what chemicals. Once such timetables and schedules have been detailed, it is then possible to determine what load reductions are appropriate and further devise means to achieve those reductions.

7.2 The Role of the International Joint Commission

Specific governmental regulatory reform will be outlined both in the submission by the National Wildlife Federation and throughout the tenure of the Program for Zero Discharge. However, it is submitted that the International Joint Commission must take the lead in developing a coordinated zero discharge strategy. Accordingly, it is recommended that the International Joint Commission:

1. **take a more active and coordinating role in monitoring toxic emissions into the Great Lakes basin.** In this way, basin governments and the public will have more of a quantitative understanding of the discharges to the Great Lakes and thus be able to judge progress on the way to zero discharge;
2. **take a more aggressive approach to reporting on governmental**

adherence and compliance to the Great Lakes Water Quality Agreement. In particular, the IJC should take a more comprehenisve approach to reporting progress under Annex 12 of the Agreement, including an impartial and objective assessment of governmental progress in incorporating waste reduction and pollution prevention approaches in their regulatory strategies;

3. assist in the development of uniform water quality standards and pollution control requirements for toxic pollutants to end competition between the basin jurisdictions for industrial development;

4. promote a "Toxics Freeze" prohibiting any increased dumping of the most dangerous toxic chemicals into the air, water, or onto land within the Great Lakes ecosystem;

5. develop a comprehensive "model" pollution prevention strategy for the Great Lakes governments to implement. As noted above, the IJC must lead the way in developing regulatory options to further the zero discharge goal. Hence, it ought to be a visionary in developing legal, economic, and policy mechanisms which could be adopted by governments. Similarly, in cooperation with all governments, the IJC could be a clearinghouse for information on pollution prevention.

6. renew its efforts to ensure that all sources of pollution, and in particular, non-point sources of toxic chemicals are identified and subject to control and elimination efforts by the governments.