

PROGRAM FOR ZERO DISCHARGE

A PROJECT OF THE

CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW AND POLICY

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RESPONSE TO THE FEDERAL PULP AND PAPER REGULATORY STRATEGY

Prepared by

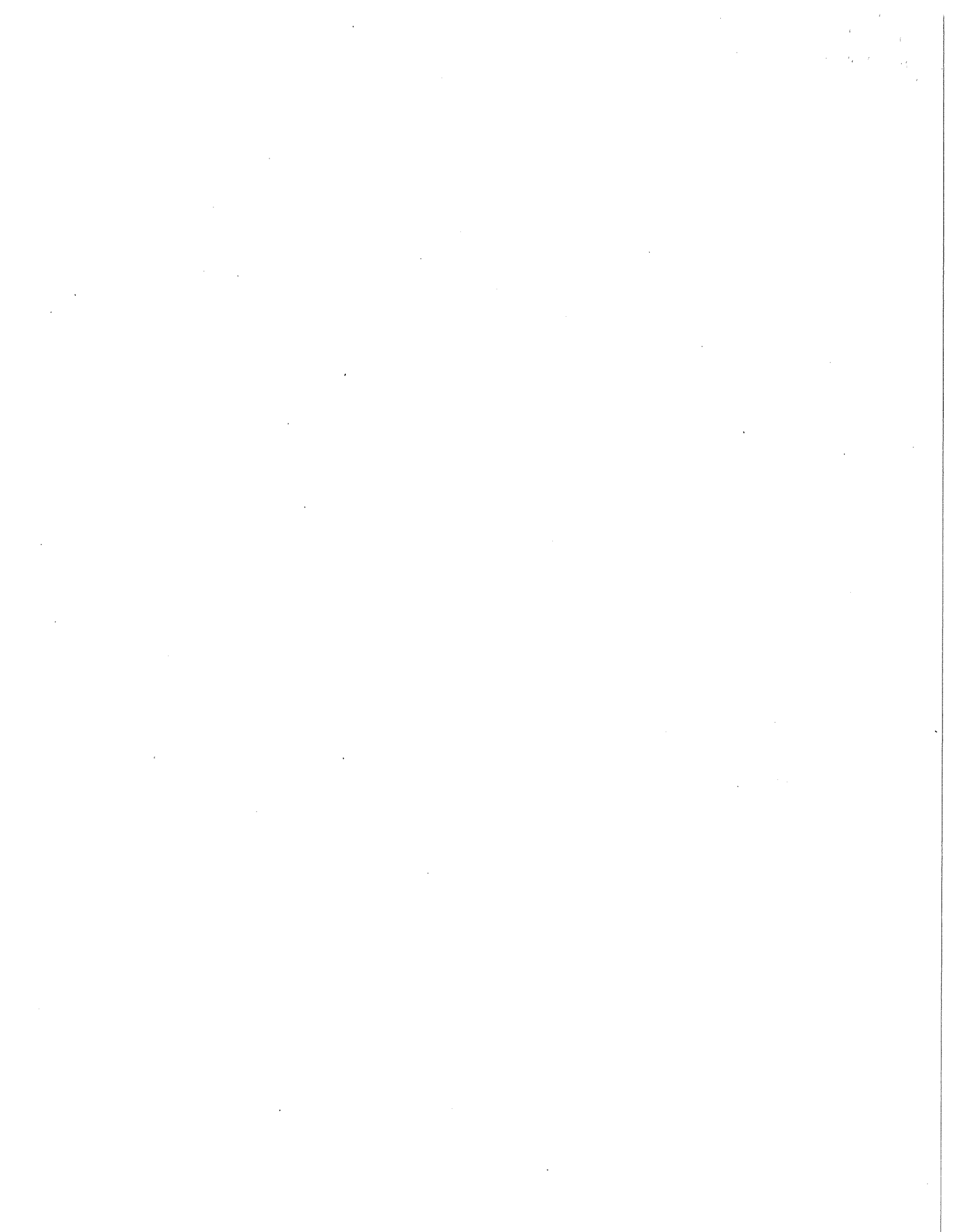
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By Paul Bentley
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THE PROGRAM FOR ZERO DISCHARGE

The Canadian Institute for Environmental and Policy

The Canadian Institute for Environmental Law and Policy (CIELAP) is a non-profit, research based organization. CIELAP is collaborating with the Great Lakes Natural Resource Office of the National Wildlife Federation (NWF), located in Ann Arbor, Michigan, in a project called the Program for Zero Discharge.

The objective of the Program for Zero Discharge is to develop and advocate proposals for the implementation of the provisions of the Great Lakes Water Quality Agreement (GLWQA), and in particular, those provisions dealing with persistent toxic chemicals. Under the Agreement, Canada assumed the obligation to "virtually eliminate" the discharge of persistent toxic chemicals. Annex 12 of the Agreement states that, to achieve the virtual elimination obligation, new regulatory strategies must be undertaken in the philosophy of zero discharge.

The research component of the Program for Zero Discharge has two parts. CIELAP is developing regulatory strategies for preventing the generation of toxins in production processes. In essence, it is a pollution prevention strategy for the Great Lakes. Part of this strategy is the development of model technology based standards aimed at implementing the goal of zero discharge. The second component, being undertaken by the NWF, is the development of model water quality standards.

The Program for Zero Discharge also has a public dissemination component. Public participation will be encouraged and information shared through workshops, fact sheets and articles. The result of this process will be the publication of a "Citizens Guide to Zero Discharge", which will give citizens the tools to advocate government adoption of Program for Zero Discharge recommendations.

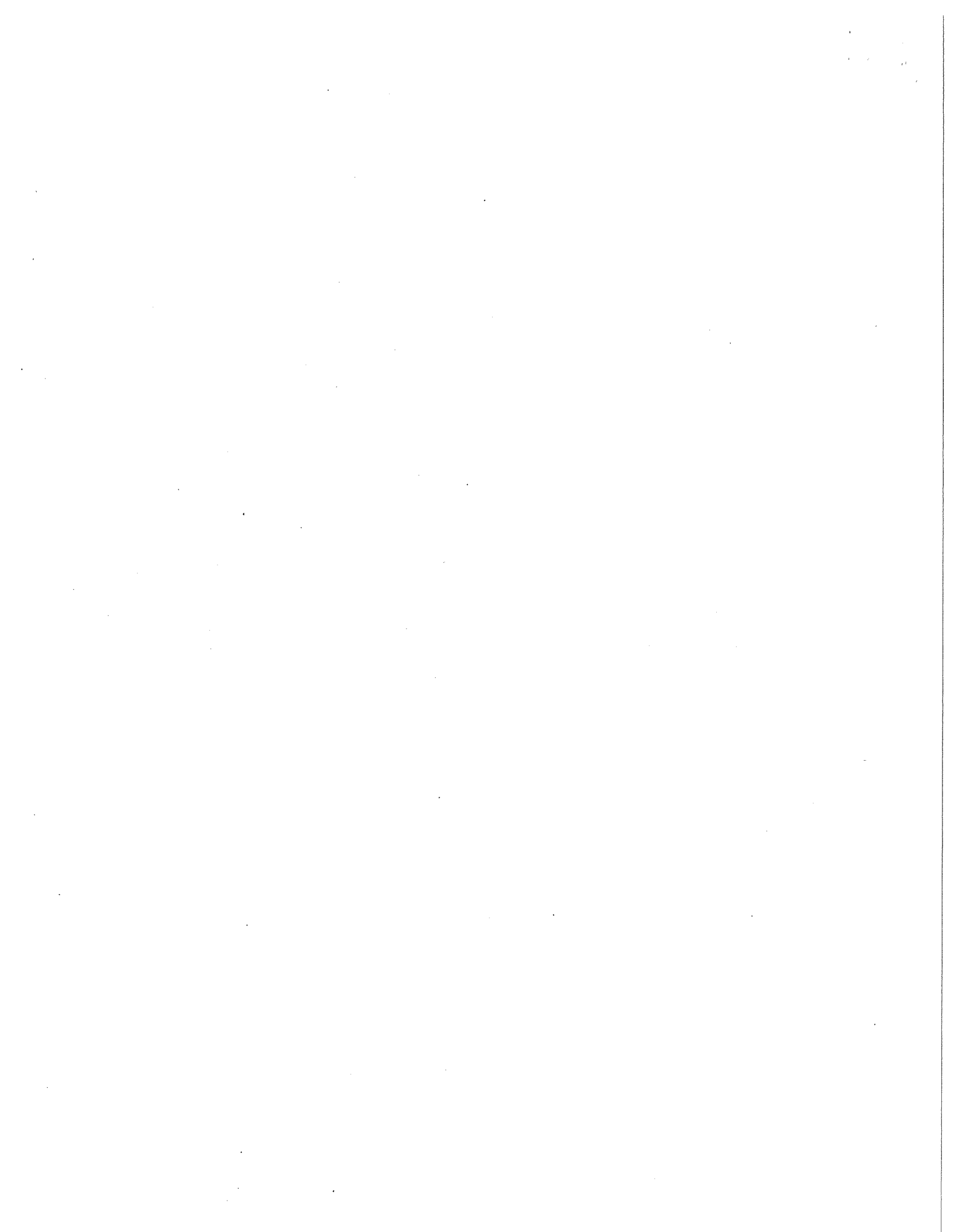


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1. Introduction

The environment remains one of the highest priorities for the Canadian public. There is particular concern about the degradation of Canadian waters by toxic pollution. Every day, tonnes of toxic chemicals are discharged into Canadian waterways to the detriment of aquatic life, wildlife and human health. Persistent bioaccumulative toxins pose one of most serious environmental challenges for the upcoming decade.

Despite decades of regulation, there have only been marginal gains in the overall reduction of toxic loadings into Canada's waterways.¹ Existing regulatory regimes are inadequate because they remain predominantly control-based which attempt to find "safe" or "acceptable" levels of discharge. Yet, many toxins are bioaccumulative and persistent, suggesting that any discharge will contribute to the overall toxic burden of an aquatic ecosystem. The only effective strategy is to eliminate discharges of persistent toxic chemicals at their source. That is the strategy that has been agreed to under the Great Lakes Water Quality Agreement and that is the approach demanded by the Canadian public.²

New pollution prevention strategies are therefore needed to ensure that toxic by-products and residues are not generated in production processes. To drive technological innovation, the regulatory framework must be reformed to reflect the philosophy of zero discharge.

It is in this context that CIELAP is pleased to have this opportunity to comment on the Federal Regulatory Strategy for the Pulp and Paper Industry. This Strategy or package of reforms are as follows:

Under the Canadian Environmental Protection Act (CEPA), two regulations are proposed. The Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations apply to mills that use a bleaching process. The regulation will prohibit the release to the environment of final effluent that contains any measurable concentrations of 2,3,7,8 TCDD or 2,3,7,8 TCDF. The Pulp and Paper Mill Defoamer and Wood Chips Regulations regulate the sale and use of defoamers containing defined concentrations of non-chlorinated dioxins and furans, and ban the sale and use of wood containing polychlorinated phenols.

Under the Fisheries Act, amendments are proposed to make the Pulp and Paper Effluent Regulations more stringent for three "deleterious substances"; total suspended matter (TSM), Biochemical Oxygen Demand (BOD), and Acutely Lethal Effluent.

In reviewing the Federal Regulatory Strategy for the Pulp and Paper Industry, the analysis and recommendations contained in this submission are based on the following premises:

(1) to fulfil the obligations undertaken by the government of Canada under the Great Lakes Water Quality Agreement and to protect aquatic life, wildlife and human health, the goal of zero discharge of persistent toxic chemicals must be incorporated into all regulatory strategies;

(2) as interim goals, total mass loadings of persistent toxic substances must be achieved with defined targets and deadlines; and

(3) pollution prevention must be considered both as a policy and regulatory priority for the development of current and future regulatory approaches.

2. Zero Discharge: Its Ecological and Legal Basis

Before the Federal Strategy is assessed, it may be worthwhile to review the ecological and legal context upon which these reforms should be evaluated. One of the key elements of this context is the extent to which the Federal Strategy will work toward achieving the goal of zero discharge. This goal is justified on the basis of the ecological and human health consequences of the release of these toxins and the legal obligations which Canada has committed to in the past.

The concept of zero discharge has not been taken seriously by corporate or political decision-makers. However, it is now a priority for the public, international organizations and Great Lakes governmental agencies.

2.1 The Ecological and Human Health Impacts of Persistent Toxic Substances

Toxic chemicals have, and continue to, harm aquatic ecosystems, wildlife, and human health in Canada. Traditionally, the Great Lakes has been viewed as a snapshot of the kinds of ecological disruption which can occur in Canada from the discharge of toxic chemicals.

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 into the Great Lakes affect ecosystem health.

Finally, while Article II commits the parties to the virtual elimination of persistent toxic substances, Annex 12 mandates that regulatory programs and strategies be adopted in the philosophy of zero discharge. 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 does not provide any tolerance for the discharge of any persistent toxic chemicals.

3. CEPA: Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations

In light of this context, there are a number of issues raised in the Pulp and Paper Mill Effluent Regulations proposed under the Canadian Environmental Protection Act (CEPA). These are as follows:

3.1 Prohibition of TCDD and TCDF - Section 3(1)

The prohibition of 2,3,7,8 TCDD and 2,3,7,8 TCDF in section 3(1) can only at best be considered an initial attempt to address the problem posed by the generation of organochlorines in bleaching processes. The regulation goes no further than to monitor other chlorinated dioxins and furans which are also known to be of a major ecological concern. The dioxins and furans identified in section 4 of the regulation for monitoring purposes have been classified as persistent and bioaccumulative.⁶ In order to avoid their biomagnification in the environment, they must also be prohibited as soon as possible.

The regulation does not even address other organochlorines that are known to be toxic, nor does it stipulate measures that must be taken to discover those that are still unknown. It is suggested in the federal overview of the regulatory strategy

for the pulp and paper industry that a separate process is underway at the bureaucratic level to evaluate organochlorines for purposes of regulation, but this process is not described. A partial solution is not possible with respect to bioaccumulative chemicals and therefore all organochlorines should be prohibited in the regulation.

In sum, the regulation does not fulfil the commitment in the GLWQA to virtually eliminate all persistent toxic chemicals generated by the pulp and paper industry. In order to do so all the discharges of organochlorines must be prohibited.

3.2 Measurable Concentration - Section 3(1)

In addition to being defined too narrowly, the prohibition on TCDD and TCDF is ineffectual because it is qualified by a "measurable concentration test". According to section 3(1), TCDD and TCDF are not to be released in a final effluent in "any measurable concentration."

In effect, therefore, the regulations are controlling the discharge of certain substances to the environment to the extent that those substances are detectable in the effluent. It is submitted that this is an inappropriate approach and does not conform to the definition of virtual elimination or zero discharge as interpreted in the Great Lakes Water Quality Agreement.

First, the bioaccumulative nature of these organochlorines means that the release of these substances, even below the levels of detection, over a long period of time can do serious damage to the ecosystem. Hence, although there may be no detectable amount in the water column, the accumulation factor in fish and wildlife may still be significant over time.

Virtual elimination and zero discharge does not mean "non-detection". Instead, these concepts refer to the approach of moving up the effluent pipe and examining ways and means to eliminate or avoid the generation of pollutants in the industrial process itself. The only way to eliminate organochlorines is to find alternatives to the bleaching processes in which they are generated. Therefore, pollution prevention mechanisms must be substituted for the measurable concentration test in the regulation.

The "non-detection" approach can only be considered legitimate if it is interpreted as an interim step to virtual elimination. This is the approach taken in the Great Lakes Water Quality Agreement (Supplement to Annex 2). However, even in the Agreement, a more broad and ecologically based definition of "absent" is given:

"absent" means that substances are not detectable when

In the past, much research was devoted to the carcinogenic effects of toxic chemicals. While these effects are important, recent research has clearly demonstrated a direct relationship between toxic water pollution and a whole range of more subtle problems. Some of these problems include: physical deformities, reproductive failures, tumours, and other physiological effects in birds, fish, and other biota.

For example, the fate of the bald eagle which has been a dominant inhabitant of North America for one million years, dramatically illustrates the danger to wildlife. In 1986, there were reported to be only 25 nests on the Lake Superior shoreline, 4 on Lake Michigan, 4 on Lake Huron, and 12 at the western end of Lake Erie. There were no nests on Lake Ontario. Nesting success along the shores has been relatively poor when compared with inland populations. The bald eagles preference for fish and other aquatic food sources has made it particularly vulnerable to chemicals that biomagnify in the ecosystem. The bald eagle is an excellent indicator of toxic contamination because it sits at the top of the food web.³

Considerable debate surrounds the human health impacts from persistent toxic water pollution. Known or suspected impacts range from cancer, genetic mutation, reproductive and behavioral abnormalities and learning disabilities to physical irritation or other temporary illnesses. Some parts of the population, such as children, pregnant women and sensitive individuals, are at a greater risk than others.⁴ To date, the only rigorous study undertaken on humans in the Great Lakes basin looked at mothers in western Michigan who ate Lake Michigan fish on a regular basis. The results of this study provide ample reasons to suspect exposure to chemicals, particularly PCB's, was damaging to the offspring of those mothers. The researchers found the length of the gestational period, birth weight, skull circumference and cognitive, motor and behavioral development of the infants were adversely affected by the mother's lifetime consumption of Lake Michigan fish.⁵ The common pathways by which humans are exposed to toxic contaminants through contact with water are drinking, washing, swimming, and other recreational uses; inhalation; and through consumption of food.

The Fifth Biennial Report of the International Joint Commission (IJC) on Great Lakes Water Quality concludes that persistent toxic substances in the Great Lakes Basin Ecosystem pose serious health risks to living organisms. The report states that, "when available data on fish birds, reptiles and small mammals are considered along with human research, the Commission must conclude that there is a threat to the health of children emanating from exposure to persistent toxic substances, even at very low ambient levels".

The 1989 Report of The Great Lakes Water Quality Board to the (IJC) concludes that the Pulp and Paper Industry is a significant source of toxic substances to the Great Lakes Basin. The principal dischargers of toxins within the industry are kraft mills which generate chlorinated organic matter during the production of bleached pulp. The effluent of the seven kraft mills in Ontario which discharge into the Great Lakes basin contains dioxins, furans, and other organochlorines which are persistent and bioaccumulative. Total discharges into the Great Lakes of organochlorines are of the order of 10,000 tons per year. The Water Quality Board recommends that the parties to the GLWQA "develop regulations to control the discharges of chlorinated organics from the pulp and paper sector, with a focus on zero discharge of 2,3,7,8 TCDD and 2,3,7,8 TCDF, and virtual elimination of all other persistent chlorinated organic substances".

2.2 The Legal Basis: The Great Lakes Water Quality Agreement

In the Great Lakes region, the federal government has committed to the goal of virtual elimination of persistent toxic chemicals under the Great Lakes Water Quality Agreement (GLWQA). The government would be inconsistent and irresponsible were it not to uphold the same standard for Canada's other waterways. Article II of the Agreement establishes a hierarchy of obligations in terms of which the draft regulations will be measured in this submission. 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 harmful amounts shall be prohibited. Further, the discharge of persistent toxic substances shall be "virtually eliminated". The qualifying statement, "to the maximum extent practicable" found in the general commitment to eliminate all chemicals is not present in the obligations pertaining to persistent toxic substances. The commitments to eliminate the discharge of persistent toxic substances is to be strived for in a more diligent way than for other pollutants.

The clear intention of the GLWQA is that virtual elimination 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.

analyzed using the best available technology, which may include biological indicators. Detection levels will be subject to change as technology improves and new levels are adopted.

In sum, therefore, section 3 is not an appropriate definition for the purposes of eliminating the designated substances. Moreover, if the non-detection approach is taken, it should be considered as an interim step to virtual elimination and a more comprehensive definition be adopted.

3.3 Definition of Final Effluent - Section 3 (1)

Another potential problem in the regulation is the absence of an explicit multi-media scope. The phrase "released to the environment" in section 3(1) would be clearer if a definition of the "environment" encompassing land and air was attached. Without such a recognition of the potential impact on other environmental media the regulation is self-defeating. For example, the definition of final effluent as "wastewater release from a mill or a waste treatment system that receives wastewater from a mill", does not encompass sludge which results from the biological treatment processes that the industry will be required to introduce to implement the regulation. The sludge is likely to be deposited into landfills or incinerated, merely transferring the problem from water to land or air, unless this is explicitly prohibited.

Hence, the regulation must make reference to, and then address, the inter-media transfer of pollutants.

3.4 Plans and Specifications - Section 3(2)

There is no positive action incorporated into the draft regulations to prevent the generation of organochlorines in the production processes of Kraft Mills. If the Federal Strategy is to take a pollution prevention approach, it is imperative to establish this priority in the plans and specifications set out in section 3(2). The regulation could make the adoption of process changes that meet the prohibitions a condition for approval of a plan. In addition, the government might use section 3 (2) to establish that the prohibition applies to all environmental media.

3.5 Monitoring and Reporting Requirements - Section 4

Section 4 sets out monitoring and reporting requirements for 2,3,7,8 TCDD, 2,3,7,8 TCDF and other chlorinated dioxins. The monitoring requirements are

insufficient. The monitoring frequency should be designed to yield sufficient data for the development of further regulations. For example, the Great Lakes Water Quality Board recommends that sampling frequencies should be at least once per month to develop guidelines for organochlorine discharges by pulp and paper mills.

The monitoring and reporting provisions of the regulation do not specify that they are public documents. Canadian citizens have the right to enforce laws through private prosecutions and these reports are essential to the exercise of that right.

3.6 Recommendations

In light of the issues discussed above, CIELAP recommends the following:

- (1) the elimination of bioaccumulative persistent compounds from pulp and paper facilities. The use of chlorine bleaching processes in the pulp and paper industry must therefore be banned. More specifically, all organochlorines should be prohibited under section 3(1).
- (2) A provision should be included in the regulation which extends the scope of the prohibition to all environmental media.
- (3) Section 3(2) should specify process changes that must be adopted to meet the prohibition as a condition for approval of a plan.
- (4) The monitoring frequency specified under section 4 should be changed to once per month, at the very least.
- (5) All monitoring data should be made public in a timely and accessible fashion.

4. CEPA; Pulp and Paper Mill Defoamer and Wood Chip Regulations

4.1 Allowable Concentrations of Dibenzo-furans and dibenzo-para-dioxin in Defoamers.

Section 3 regulates the sale and use of defoamers containing non-chlorinated dioxins and furans, and the sale and use of wood containing polychlorinated phenols in the manufacture of pulp. For defoamers, the dibenzofuran concentration shall not exceed 40 ppb and the dibenzo-p-dioxin concentration shall not exceed 20 ppb. For wood, there shall be no polychlorinated phenols.

These regulations are moving in the right direction in terms of a pollution prevention policy because the problem is attacked at the process rather than discharge stage in production. The ban on wood containing polychlorinated phenols is laudable in this respect. However, the thresholds established for defoamers are inappropriate because non-chlorinated dioxins are precursors to prohibited chlorinated dioxins, and dibenzofurans are persistent and bioaccumulative.

4.2 Recommendation

CIELAP recommends a ban on Defoamers containing precursors to chlorinated dioxins and furans, or any other organochlorines.

5. Fisheries Act: Pulp and Paper Effluent Regulations

There are three principal issues arising from the amendments to the Fisheries Act. They are as follows:

5.1 Form of the Limits

The proposed amendments to the 1971 regulations define total suspended matter (TSM), Biochemical Oxygen Demand (BOD), and acutely lethal effluent (ALE) as, "deleterious substances". For BOD and TSM the draft regulations propose more stringent formula's for determining deposition limits as a function of production rates.

The production based formulas for BOD and TSM do not take into account the impacts on receiving waters. Moreover, companies can avoid limits by increasing production. As a result, the interests of the ecosystem in the reduction of total loadings of pollutants are not considered. This is contrary to the fundamental purpose of the GLWQA described in Article II, "to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Ecosystem". In order to protect the ecosystem rather than industry, the amendments should be based on water quality standards rather than production rates.

5.2 Definition of Acutely Lethal Effluent

The draft regulations propose an LC50 test for determining acutely lethal effluent. The LC50 test determines effluent to be lethal when 100% concentration kills 50% or more of the fish tested during a 96 hour period. Monitoring is also required for daphnia. If effluent fails this same test using daphnia then testing for fish must be

stepped up. However, failure of the daphnia test by itself is not sufficient, under the amendment, for effluent to be considered lethal.

The proposed definition of acute lethality is too simplistic. First, the test for acutely lethal should be extended to include daphnia. This is the approach that is undertaken in other jurisdictions such as the United States. While it is a much more sensitive indicator, it does give a more ecologically based understanding of the impacts of effluents on receiving waters.

Second, it is imperative that toxicity tests include tests for sub-lethal and chronic impacts. As now proposed, the emphasis is on acute impacts which, while important, does not take into account a whole range of more subtle and long-term effects.

5.3 Plans for Elimination Of Acute Lethality - Schedule 3

The Proposed changes to the Fisheries Act are similar to those to CEPA in that they do not extend to positive action to prevent the generation of toxic substances which cause lethality in effluent. It would be possible for the government to require that plans submitted under schedule 3 "to eliminate acute lethality in the effluent" contain process changes as a condition for approval, as recommended in regard to CEPA. The process for the development of these plans should also be further clarified in the regulation. The regulation should specify the criteria for approval of the plans, the time limit for implementation, and measures that will be taken to ensure compliance.

5.4 Authorizations Process

The proposed regulations contain an authorizations process for exceedences of deposition limits of TSM and BOD, and for exceedences by plants built before 1971. These authorizations create another loophole in the amendments reflecting the lack of commitment of the government to the philosophy of zero discharge. Moreover, there is no provision for public consultation with respect to this authorizations process. The public interest in ensuring compliance rests on such participation.

5.5 Recommendations

In light of the above discussion, CIELAP makes the following recommendations:

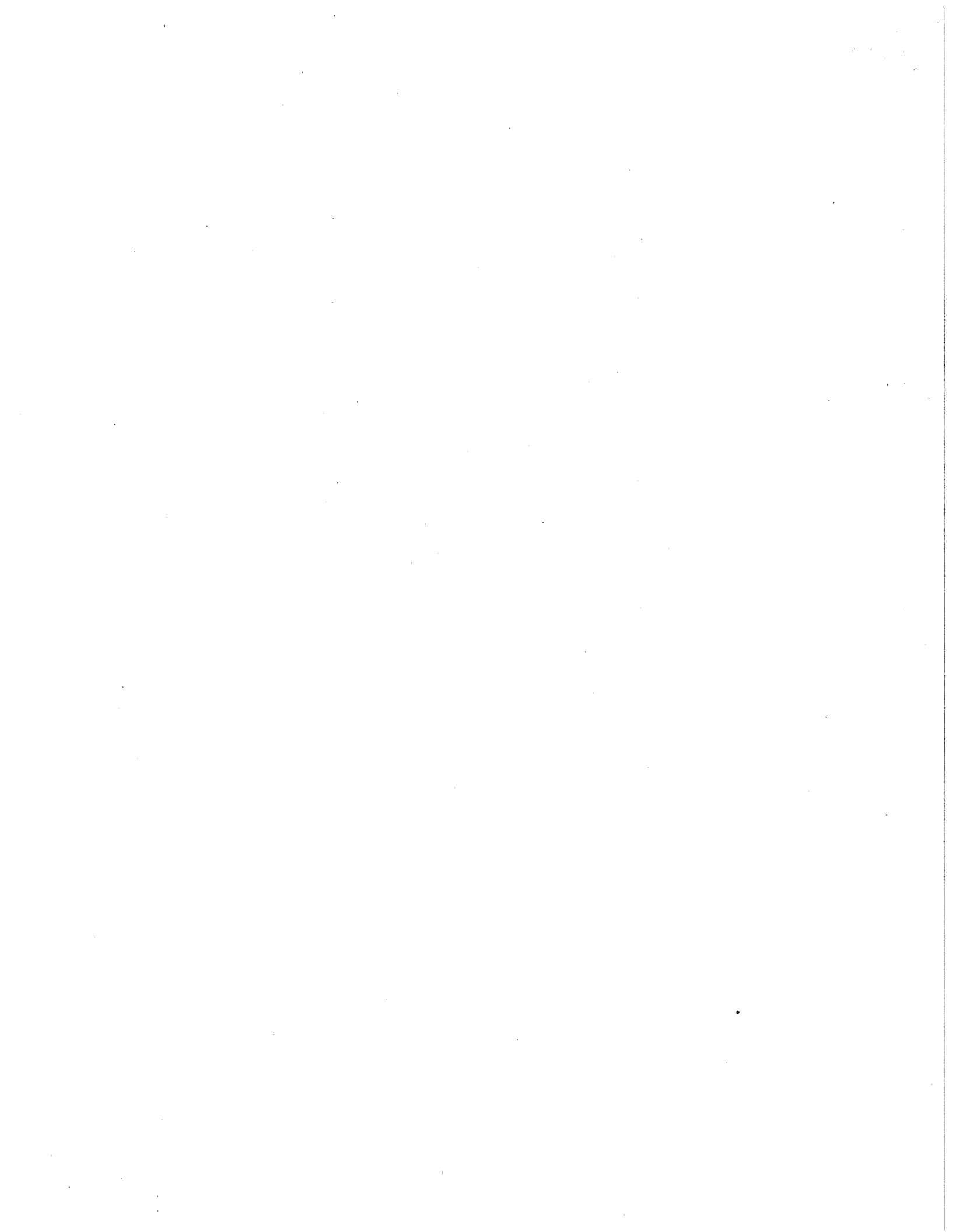
(1) an explicit prohibition on toxic-contaminated effluent with lethal or sub-lethal effects;

- (2) a cap imposed on inputs of BOD and TSM based on water quality standards;
- (3) plans submitted under schedule 3 contain process changes as a condition for approval;
- (4) plans under schedule 3 specify criteria for approval, time limit for implementation, and measures to be taken to ensure compliance.
- (5) removal of provisions for authorizations of exceedences for TSM, BOD, and ALE.
- (6) provision for public consultation with respect to authorizations, planning, and monitoring.

6. Conclusion

The regulatory strategy proposed by the federal government for the pulp and paper industry has a number of positive innovations in it. However, there are a number of other areas in which there is a need for reform. This framework cannot be expected to adequately achieve the obligations assumed under the GLWQA. For example, the measurable concentration test under CEPA is inherently biased toward allowing some toxic contaminants to be released into the environment. Moreover, the controls proposed do not even attempt to encompass all toxic effluent from pulp and paper mills. The CEPA regulations omit organochlorines other than TCDD and TCDF, and the Fisheries Act amendments do not regulate sub-lethal effluent.

The government needs to pursue the preventive approach taken with regard to wood containing poly-chlorinated phenols on a comprehensive basis. Essentially, this means a ban on bleaching processes in pulp and paper mills. The absence of a strong social or economic justification for the production of white paper presents an opportunity for the government to set a new direction for environmental policy in these regulations.



ENDNOTES

1. Muldoon, P. and M. Valiante, Toxic Water Pollution in Canada (Calgary: Canadian Institute of Resources Law, 1988), at pp. 20. The situation is the same in the U.S., see: B. Commoner,
2. In a Decima poll conducted in September of 1989, it was reported that 9 out of 10 respondents wanted zero discharge for Lake Ontario.
3. The Conservation Foundation: Great Lakes, Great Legacy?
(The Institute for Research on Public Policy, Ottawa, Ontario 1990)
4. Paul Muldoon and Marcia Valiante: Toxic Water Pollution In Canada (The Canadian Institute of Resources Law, The University of Calgary, Canada 1988)
5. International Joint Commission : Fifth Biennial Report on Great Lakes Water Quality , 1990.
6. Ontario Ministry of the Environment: Effluent Monitoring Priority Pollutants List, provides basis for the development of chemical specific monitoring regulation under the Municipal-Industrial Strategy for Abatement program.

