CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW & POLICY

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THE CANADIAN BIOTECHNOLOGY PROJECT

A RESEARCH PROJECT OF

THE CANADIAN INSTITUTE FOR ENVIRONMENTAL

LAW AND POLICY (CIELAP)

AND THE POLLUTION PROBE FOUNDATION

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THE CANADIAN BIOTECHNOLOGY PROJECT

EXECUTIVE SUMMARY

"Since genes determine the basic structures and biological potentials of all living forms, the ultimate potential of genetic engineering for the modification and redesign of plants and animals to meet human needs and desires seems virtually unlimited. Such capabilities will pose major questions as to the extent to which mankind will want to assume the responsibility for the life forms of the planet."[1]

"[W]e have had an Industrial Age, an Age of Steam, the Automotive Age, and so on, up to the Atomic Age. Now we are at the crossroads of a new age: the Age of Biology."[2]

What is biotechnology?

Simply put, biotechnology is any manufacturing, industrial or service activity that entails the use of a biological organism, system or process. Cheese making, wine making and brewing are all successful biotechnology applications that have been refined over centuries of experimentation. The selective breeding of farm animals to create hardier stock, or the cross pollination of fruits or vegetable varieties to improve taste or yield were also being practised long before the term biotechnology, or the basic science that underlies it, were ever imagined.

Why has biotechnology become such an important issue today?

Until recently, biotechnology was only understood on theoretical level. Advances took decades and, in some cases, generations of patient, hit-or-miss experimentation. Our ancestors could cross-breed members of the same or, with some limited success, closely related species. They could isolate and encourage the growth of yeasts, bacteria and other useful micro-organisms. But they could not create new forms of life.

In the last twenty years, however, research scientists have developed tools and techniques that allow them to literally get inside cells and alter the genetic information they contain. It has become possible manufacture new organisms, and to rebuild existing plants or animals to change the way they grow, react or behave. This new branch of biotechnology, which has become known as genetic engineering, has the potential to revolutionize our lives.

What are the benefits of biotechnology?

The fruits of genetic engineering and other biotechnologies are no longer the stuff of science fiction. In the early 1980s, human insulin, created through genetically engineered micro-organisms, was the first biotechnology product to reach the commercial market. Since then, genetic engineers have been developing a wide range of revolutionary therapies, vaccines and diagnostic tools to serve in the battle against haemophilia, hepatitis C, diabetes, AIDS, cancer, and other ravaging diseases.

While pharmaceutical companies dominate the fledgling biotechnology industry, genetic engineering also promises greener, cleaner production processes that do not rely on dangerous chemicals. The pulp and paper industry, for example, is developing new enzyme-based technologies for making paper without the use of chemical bleaches. Hardier, disease or pest-resistant crops may help alleviate global hunger, and the environmental protection industry is counting heavily on advances in biotechnology. Sewage treatment plants already use micro-organisms to break down millions of litres of residential and industrial wastes. Meanwhile, specially-designed microbes are literally eating their way through organic pollutants that contaminate our fields and streams.

Why should Canadians be concerned?

Biotechnology is still in its infancy and is accompanied by a significant degree of scientific uncertainty. There are many unanswered questions regarding the side effects of a particular type of genetic alteration. The results of a genetic experiment can be difficult to predict with any high degree of confidence. While the probability is low that something will go wrong, if it does, the environmental consequences could be extremely serious, far-reaching and almost impossible to repair. Unlike the other synthetic, toxic or radioactive creations of modern technology, the products of genetic engineering are living organisms which can grow multiply and spread.

In the same way that the English sparrow and the starling or, more recently, the zebra mussel and the purple loosestrife overwhelm and displace dozens of native species, a genetically-improved organism could multiply and quickly spread through the environment, mutating and transferring genetic information to other organisms. With no natural predators, its population could explode if it were released into the environment either accidentally or deliberately. New strains of bacteria or other biological agents could infect and poison non-target organisms, or disrupt the natural cycling of nitrogen, carbon or other nutrients through the ecosystem. Once released, it would be almost impossible to return the genetically-enhanced genie back into the bottle.

Over the longer term, the reliance on a few highly engineered crops could reduce biodiversity in agriculture, making our food supplies vulnerable to wide-scale loss or disruption. Some experts are also concerned that the development of herbicide and pesticide-resistant crops will make our society even more dependent on synthetic chemical pest controls.

What's being done to reduce the risk?

Canadian governments believe that biotechnology should be regulated through existing laws, and are attempting to fill legislative gaps rather than develop a comprehensive regulatory regime. With no less than 17 federal agencies and 46 provincial departments and ministries expressing an interest in biotechnology, this promises to be difficult, made even more confusing by overlapping federal and provincial responsibilities.

Non-binding guidelines covering recombinant DNA lab work have been in place since 1978 but, to date, official policy has been aimed more at nurturing and promoting the biotechnology industry than implementing safeguards to protect human health or the environment from the genetically-altered fruits of their labours.

In December, 1990, the federal government released its "Green Plan" outlining its environmental agenda for the following five years. While the plan recognizes the potential economic and environmental benefits of biotechnology, it states that "with the benefits come potentially significant risks to human health and the environment." As a result, Ottawa committed itself to a national regulatory regime, including national standards and codes of practice, to prevent problems arising from the accidental or deliberate release of genetically engineered micro-organisms into the environment.

The continuing delays and regulatory uncertainties not only increase the environmental risks and prolong the possibility of accidental releases, they are also discouraging new research and investments in commercial facilities. This is driving up the costs of innovation and undermining public confidence. Both the environmental community and the biotechnology industry agree that the rules of the game must be clarified on a national basis.

What still needs to be done?

The emergence of genetic engineering techniques has given rise to a wide range of scientific, economic, ethical, legal and political issues. Since the mid-1980s, the environmental community, especially CIELAP, has recommended a thorough review and rationalization of the environmental regulations covering biotechnology in Canada. While the biotechnology industry and several government agencies have examined different aspects of

the problem, no comprehensive assessment has been undertaken. The Canadian Biotechnology Project being proposed by the Canadian Institute for Environmental Law and Policy (CIELAP) and the Pollution Probe Foundation will fulfil this need.

What is the Canadian Biotechnology Project?

The Canadian Biotechnology Project consists of two key components: (1) a review of current Canadian environmental law and policy regarding biotechnology applications, and (2) a public outreach and education program. The CIELAP/Pollution Probe research team will identify ways to make the existing regulatory structure in Canada more effective, efficient and fair. In addition, it will seek to enhance public awareness of the policy issues related to biotechnology development. These objectives will be achieved though:

* an examination of the possible applications of genetic engineering technologies and an assessment of the related environmental risks;
* an examination of the biotechnology industry in Canada; and
* an extensive review of existing legal, institutional and policy arrangements for the regulation of biotechnology within the government of Canada, the ten provinces (especially Ontario, Quebec, and Alberta), and other industrialized nations.

The results of these law and policy reviews will be presented in a series of working papers. Following their completion and release, several workshops will bring together the project's coordinators and researchers with industry, government and environmental representatives to review and discuss the findings and provide the basis of, first, an interim, and then, a final report.

The final report will present the findings of the research program and identify means of enhancing the effectiveness, efficiency and fairness of the current regulatory framework. Recommendations for action by the federal government and provincial governments will be aimed at ensuring the protection of human safety, health and well-being, as well as environmental quality. They will also seek to provide the biotechnology industry with a clear and consistent set of rules regarding its activities. A principal element of the final report will be a model biotechnology statute, which can be adopted in whole or in part by each of the provinces, to guarantee the consistent and harmonious approach to biotechnology regulation throughout Canada.

The need for public outreach

One of the principal purposes of this project is to facilitate an informed and open discussion of the public policy issues related to the commercial application of biotechnology. An integral part of the Canadian Biotechnology Project is the public outreach program that will include: the preparation of a primer on biotechnology issues, opportunities and concerns, as well as a series of fact sheets and information packages; publication of a regular newsletter; and establishment of an on-line computer database. Access to this information will be possible through: the Canadian Environmental Network's mailing list of over 1,800 citizens and environmental groups; Pollution Probe's information office (which fielded over 30,000 requests for environmental information in 1991); and appropriate library, school, university and college distribution networks.

Why CIELAP and Pollution Probe?

This effort will draw upon the extensive experience of CIELAP and Pollution Probe in environmental law and policy research and development. The proposed project will also build upon their decades of experience in the development and delivery of public outreach and education programs. The two organizations are uniquely positioned to provide a comprehensive review of the environmental, technical and legal issues that must be addressed in the environmental regulations of biotechnology applications in Canada.

Founded in 1970, CIELAP is an independent, non-profit research and educational organization established to identify emerging environmental issues, analyze current environmental policy questions, and evaluate the possible legal and policy responses for the public and private sectors. The results of these efforts are then communicated to decision-makers in the public and private sectors in a clear and non-partisan manner. CIELAP seeks to be at the leading edge of environmental law and policy research in Canada.

Founded in 1969, Pollution Probe has become one of Canada's most respected environmental organizations and, over the years, has worked with the country's leading scientists, government officials and industry experts to devise practical solutions to the pressing environmental issues. Pollution prevention, hazardous waste reduction, acid rain, water quality, global warming, the preservation of agricultural lands: Pollution Probe has tackled these and dozens of other issues to ensure the health of Canadians and the protection of the environment.

The effective, efficient and fair regulation of biotechnology represents a serious and difficult challenge to the federal and provincial governments of Canada. This is a challenge that must be met if we are to realize the benefits without compromising human health and safety or environmental protection.

The proposed joint CIELAP/Pollution Probe biotechnology research program could play a major role in the shaping of the Canadian regulatory agenda for biotechnology towards that end.

Support for the Canadian Biotechnology Project

Funding and other support for the Canadian Biotechnology Project is being sought from a number of different sources, including private foundations, corporate sponsors, and the appropriate research assistance programs operated by the federal or provincial governments. Several organizations and agencies, including the Ontario Ministry of Environment, have already pledged support. CIELAP and Pollution Probe are currently in the process of seeking additional project funding. For more information, contact:

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THE CANADIAN BIOTECHNOLOGY PROJECT

1. INTRODUCTION

The emergence of genetic engineering techniques has given rise to a wide range of scientific, economic, ethical, legal and political issues. The CIELAP/Pollution Probe biotechnology project will seek to identify means by which the existing regulatory structure in Canada can be made for effective, efficient and fair. In addition, it will seek to enhance public awareness of the policy issues related to biotechnology development. These objectives will be achieved though:

1) a detailed examination of existing law and policy related to biotechnology in Canada and other industrialized nations; and

2) a public outreach program.

This effort will draw upon the extensive experience of CIELAP and Pollution Probe in environmental law and policy research and development, and public eduction.

2. THE COMPONENTS OF THE BIOTECHNOLOGY PROJECT

2.1. THE LAW AND POLICY REVIEW

Recent years have seen an extremely rapid growth in the biotechnology sector and a rapid expansion of the commercial availability of biotechnology products. These developments emphasize the need for a detailed evaluation the present regulatory framework. In response to this situation, CIELAP and Pollution Probe are proposing to conduct an extensive review of existing legal, institutional and policy arrangements for the regulation of biotechnology within the government of Canada and the governments of the ten provinces. The intention of the CIELAP/Pollution Probe undertaking will be to arrive at specific recommendations as to how the effectiveness, efficiency and fairness of these structures might be enhanced.

2.1.1. Establishing Parameters and Evaluative Criteria for the Law and Policy Review

An examination of the possible applications of genetic engineering technologies will be undertaken as the first step in establishing the parameters of the law and policy review. This will be followed by an effort to identify and assess the environmental risks associated with these applications. Particular attention will be given to the problem of uncertainty in predicting the outcomes of the use of genetic engineering techniques.

This review of the scientific issues in the regulation of biotechnology will be accompanied by an examination structure of the biotechnology industry in Canada. This will be of assistance in identifying the likely future directions of biotechnology applications in Canada. It will also be useful in the assessment of the effects of the existing regulatory structure, and of the possible results of the introduction of changes to that system.

Biotechnology gives rise to a wide range of ethical concerns. These include the immediate issue of preventing harm to human safety, health and well-being, and to the natural environment. Further questions have been raised in relation to specific applications of biotechnology. Concerns have been expressed, for example, regarding the appropriateness of the use of genetic engineering to create pesticide resistant crops, in order to facilitate the increased use of pesticides to overcome adaptation by subject pests.[3] Even more broadly, some have queried, on ethical grounds, any employment of genetic engineering techniques.[4] An exploration of the ethical issues surrounding the regulation of biotechnology will be of assistance in the definition of the scope and evaluative criteria for the law and policy review.

Parameters

The examination of the scientific, economic and ethical dimensions of the biotechnology applications will provide the basis for the identification of those aspects of biotechnology applications which require regulatory attention. A preliminary review suggests that the following areas will deserve close study:

* the existing provisions for the environmental assessment and approval of the release of genetically-engineered organisms into the environment;

* the present arrangements for access to information and public participation decision-making related to biotechnology applications.;

* the extent of contingency planning in the event of an accidental release or unanticipated negative effects;

* the existing liability regime;

* the patenting rules; and

* the general approval process for biotechnology products.

Evaluative Criteria

The existing legal and policy arrangements in these areas

will be evaluated in terms of the following criteria:

* **Effectiveness** - The regulatory structure should provide for the protection human safety, health and well-being, and environmental quality. These concerns ought to be addressed in terms of the needs of present and future generations, in a manner consistent with the sustainable development principle. At the same time, the approval of safe, appropriate and useful applications of biotechnology should be facilitated.

* **Efficiency** - Regulatory goals should be achieved in a manner which conserves scarce public and private resources. In addition, regulatory requirements and procedures should be clearly understandable to the affected industries and members of the public. It should be possible to reach regulatory decisions in a timely manner.

* **Fairness** - All of the affected societal interests should be provided with opportunities for input into the decision-making process, and the lines of accountability for the decisions reached should be clear. In addition, the regulatory structure should provide for a fair and reasonable distribution of costs, benefits and risks within society.

2.1.2. The Review of Law and Policy In Canada

Within the context of the parameters and evaluative established as the first stage of the law and policy review, an examination of the existing regulatory regimes for biotechnology within the Canadian federal government and the ten provincial governments will be undertaken. This will entail a review of the current statutory and institutional arrangements within the federal and provincial governments.

The development of the policy approaches of these governments to biotechnology regulation also will be explored. The evolution of the relationships between the principal regulatory agencies and advisory bodies, and the biotechnology industry, university researchers, environmental groups, and other members of the biotechnology policy community will be given particular attention. This will involve extensive contacts with the biotechnology industry, regulatory officials and other participants in the policy process.

2.1.3. The Review of Law and Policy in Other industrialized Countries

While biotechnology has had a relatively low public profile in Canada, it has been the subject of considerable public debate in a number of other industrialized countries. In the United

States, the states of North Carolina and Minnesota have enacted legislative specifically intended to regulate biotechnology. Some members of the United States Congress have indicated a desire to move in a similar direction.

In Europe, biotechnology statutes have been enacted by the Federal German Republic, the Netherlands, Denmark and Switzerland Detailed guidelines for deliberate releases have been established in the United Kingdom. The European Community enacted two directives on biotechnology in April 1990. These deal with the contained use and the deliberate release into the environment of genetically-modified organisms and microorganisms.

An examination of the experiences of these governments in the field may provide useful lessons for Canadian public policy decision-makers. Therefore, the CIELAP/Pollution Probe project will include a review of the recent legal and policy developments in the United States and the European Community. The work of the OECD on the regulation of biotechnology applications in industrialized countries will provide a useful starting point for these studies.[5] A substantial body of academic and legal research on biotechnology regulation in the United States[6] and Europe[7] also exists. At the same time, CIELAP and Pollution Probe recognize that the institutional differences between the structure of the Canadian system of government and those of other industrial nations may limit the applicability of the approaches employed in those nations to Canada.

2.1.4. The Law and Policy Review Working Papers

The results of these law and policy reviews will be present in the form of a series of working papers. The first will address the nature of biotechnology and the environmental, economic, ethical and regulatory issues which arise from its application, laying out the parameters and evaluative criteria for the succeeding papers. These will review the regulation of biotechnology by the Canadian federal government, Canadian provincial governments, the federal and state governments in United States, and governments within the European Community.

The working papers will be approximately 10,000 words in length. They will focus on the identification of the strengths and weakness of the approaches taken by the jurisdictions under study in terms of the established parameters and evaluative criteria of the law and policy review. The best elements of the systems adopted by other nations will be highlighted, while aspects which Canadians may wish to avoid will be noted. The working papers will be summarized and presented in Canadian law and/or public policy journals.

Working Paper No. 1
Setting Parameters and Establishing Evaluative Criteria: Scientific, Ecomonic and Ethical Issues in the Environmental Regulation of Biotechnology Applications

Working Paper No. 2
The Regulation of Biotechnology by the Government of Canada

Working Paper No. 3
The Regulation of Biotechnology by Provincial Governments in Canada

Working Paper No. 4
The Regulation of Biotechnology in the United States

Working Paper No. 5
The Regulation of Biotechnology in the European Community

2.1.5 The Interim Report and Recommendations

Following the completion and release of the working papers on the regulation of biotechnology, a workshop will be held by CIELAP and Pollution Probe. This meeting will include the project coordinators, researchers and advisory committee, as well as other invited industry, government and environmental representatives. Its purpose will be to review and discuss the contents of the working papers with the intention of providing the principal researchers with a framework for the development of an interim project report. This interim report will, on the basis of the working paper findings, identify areas of weakness in the existing Canadian regulatory structure and make preliminary recommendations for reform.

After the release of the interim report, there will be a discussion period of several months. During this phase, comment will be invited from industry, government, environmental groups, the academic community and other interested members of the public. At the conclusion of the discussion period, a second workshop will be held among the project coordinators, researchers and advisory committee, together with other invited participants. At this workshop the responses to the interim report will be examined, and direction established for the content of the final report.

2.1.6 Final Report and Model Statute

The law and policy review final report will present the findings of the research program and identify the means by which the effectiveness, efficiency and fairness of the current regulatory framework in Canada can be enhanced. Recommendations for action by the federal government and provincial governments will be included. These proposals will be intended to ensure that

will be included. These proposals will be intended to ensure that the regulatory oversight of biotechnology applications provides for the protection of human safety, health and well-being and the environmental quality. They will also seek to provide the biotechnology industry with a clear and consistent set of rules regarding its activities. This will assist the industry in reaching decisions regarding long-term planning and investment.

The federal component of the final report will focus on the ways in which biotechnology issues might be addressed through the Canadian Environmental Protection Act. The report's release will coincide with the review of the Act planned for 1993-94. If a need for amendments to CEPA is identified, specific legislative proposals will be put forward. Recommendations regarding the government's policy approach to biotechnology regulation also will be made. These will include suggestions regarding the means by which the participation of a full range of societal interests in the formulation of public policy regarding biotechnology can be assured.

At the provincial level, the principal element of the final report will be a model biotechnology statute. It is intended that the statute provide a model which can be adopted in whole or in part by each of the provinces. In the event that this were to occur, it would help to ensure a consistent and harmonious approach to biotechnology regulation throughout Canada. A detailed explanation of the rationale for the provisions of the proposed provincial statute will be provided.

2.2 THE OUTREACH PROGRAM

One of the principal purposes of this project is to facilitate an informed and open public discussion of the public policy issues related to the commercial application of biotechnology. It is intended to help insure that a full range of societal interests are represented in the development of federal and provincial policies related to biotechnology.

There is currently remarkably little information available to the Canadian public which is both accessible to the general reader and provides an adequate overview of the policy issues related to the biotechnology industry. Consequently, CIELAP and Pollution Probe propose, as part of their biotechnology project, a public outreach program with the following components:

* a biotechnology primer;
* fact sheets;
* information packages; and
* a newsletter and WEB fact sheets.

This program will build upon CIELAP and Pollution Probe's two

decades of experience in the development and delivery of public outreach and education programs.

2.2.1 The Biotechnology Primer

In the past, Pollution Probe has developed primers on such issues as acid rain and the pollution of the Great Lakes. These primers have made major contributions to the public's understanding of these issue. A similar primer is proposed as part of the CIELAP/Pollution Probe biotechnology project.

The objective of the biotechnology primer will be to communicate the project findings to the public. It will be written in a manner accessible to general readers. The primer will include a discussion of the nature and potential applications of biotechnology, and of the environmental risks associated with biotechnology products. The primer will also provide an overview of the existing regulatory framework for biotechnology in Canada and describe the CIELAP/Pollution Probe project's recommendations for reform.

The primer will be distributed to the public through a number of established routes. These will include:

* the use of the Canadian Environmental Network's mailing list of over 1,800 citizens and environmental groups;
* the use of Pollution Probe's information office, which fielded over 40,000 requests for environmental information in 1990; and
* the use media, library, school, university and college distribution networks.

2.2.2 Fact Sheets

A series of fact-sheets and brochures will be developed to accompany the biotechnology primer. It is intended that these materials be as widely distributed as possible.

Fact sheets will be produced covering the following subjects:

* what is biotechnology?
* the relationship between biotechnology and sustainable development.
* the Canadian biotechnology industry.
* the environmental risks and benefits of biotechnology.

Efforts will be made to avoid duplication and overlap with other organizations, such as the Toronto Biotechnology Project, who are also proposing to prepare fact sheets on biotechnology issues. The possibility of joint efforts with these organizations, to develop some of the fact sheets, will be explored.

2.2.3 Information Packages

The selected articles from journals, books and newspapers gathered for the law and policy review will be collected and assembled into an information package on biotechnology. The package also will include a full project bibliography. The package will be made available to students, researchers, and interested members of the public. Pollution Probe has extensive experience in the development and distribution of information packages of this nature. Probe has distributed some 15,000 information packages on various environmental issues since 1990.

2.2.4 Newsletter and the WEB Network

There is a general need for up-to-date information on biotechnology among environmental groups, church groups, individuals, labour, academic institutions and other members of the interested public regarding biotechnology. To accommodate this demand, a newsletter - the "Gene Network" - is proposed as part of the CIELAP/Pollution Probe project. The "Gene Network" would identify legislative changes, assist in the development of submissions, inform the participants of general developments in the biotechnology field, and communicate project findings on an ongoing basis.

The "Gene Network" will be six to eight pages in length, and will be produced three times a year. The newsletter will be edited by the CIELAP and Pollution Probe project co-ordinators. Material will be solicited from project researchers, industry representatives, academics, environmental groups and others.

The possibility of the newsletter including an ongoing data base on the release of biotechnology products into the open environment in Canada will be explored. This would follow the practice of the United States National Wildlife Federation's biotechnology newsletter "The Gene Exchange." Pollution Probe has been attempting to monitor field tests of genetically engineered organisms, and the federal government has expressed an interest in the development of a national database or inventory of such releases. The initial results of Pollution Probe's efforts were presented in the form of a map\poster released by Pollution Probe and CIELAP in 1991.

It is anticipated that publication of the "Gene Network" will be carried on by CIELAP and Pollution Probe beyond the completion of the two-year biotechnology project. It is intended that the newsletter continue to be a source of information and a forum for discussion regarding biotechnology issues in Canada. CIELAP and Pollution Probe expect that the public policy debate over biotechnology will extend for many years into the future, and hope to be able to facilitate intelligent, informed discussion of the question on a continuing basis.

The WEB is a computer network that traverses Canada and the United States. A new subject heading will be established in WEB which will allow anyone interested in biotechnology to access current information and up-to-date developments regarding biotechnology. In addition, the "Gene Network" newsletter will be entered into the WEB.

2.2.5 Mechanisms for Further Public Discussion

It is anticipated that the project coordinators and researchers will be in a position to participate in public discussions of biotechnology issues as the opportunity arises. This will include responses to regulatory and policy developments in the field which might occur over the course of the project. The project's research program will ensure that such interventions are made on the basis of a complete and careful analysis of the issues at hand.

Further mechanisms to promote public debate regarding biotechnology will be examined during the project. The possibility of the federal Parliamentary Committee on the Environment holding a series of hearings on the issue will be raised with the committee's members. The National Round Table on Environment and Economy also may have a useful role to play in facilitating debate in the biotechnology field.

Inquiries and suggestions from interested members of the public regarding biotechnology issues will be accepted by CIELAP and Pollution Probe throughout the project. Pollution Probe and CIELAP are members of the recently formed Canadian Environment Network Biotechnology Caucus. The two organizations will share their findings with other environmental groups, the biotechnology industry, governments and other parties interested in biotechnology issues throughout the project.

3. THE PROJECT ADVISORY COMMITTEE

As has been the practice with other major projects undertaken by CIELAP and Pollution Probe, an expert advisory committee will be struck at the commencement of the project. This committee will include of representatives of the appropriate federal and provincial agencies in Canada. Representatives of the biotechnology industry, and the environmental and academic communities will also play an important role on the committee.

The purpose of the advisory committee will be to provide advice and commentary on the conduct of the project and its final products. Committee members will be asked to review drafts of the working papers, the interim and final reports, and the components of the outreach program for factual accuracy and analytical consistency and thoroughness. The advisory committee members will also participate in the two workshops to be held as part of the project.

The following individuals have agreed to serve on the advisory committee:

Stuart Bailey
Supervisor
Biotechnology Unit
Ontario Ministry of the Environment

Penny Chan, Ph.D.
Independent Consultant

John Clement, Ph.D.
Toronto Biotechnology Initiative

Prof. Sally Lerner
University of Waterloo

Terry McIntyre, Ph.D.
Head of the Biotechnology Section
Environment Canada;

Prof. Jack Pasternak
University of Waterloo

Howard Samoil
Counsel
Alberta Environmental Law Centre;

4. PROJECT MANAGEMENT

The proposed project is to be a joint undertaking of the Canadian Institute for Environmental Law and Policy (CIELAP) and Pollution Probe. This section will outline the operational relationship between the project participants.

The "Canadian Biotechnology Project"

The proposed project undertaken will be called the "CIELAP/Pollution Probe Canadian Biotechnology Project." A joint name is thought to be appropriate to demonstrate a formal relationship between CIELAP and Pollution Probe. Pollution Probe and CIELAP have undertaken large-scale joint projects in the past with great success. These have included the 1984 "Breaking the Barriers" study on barriers to industrial waste reduction, reuse and recycling, and the "Program for Zero Discharge" which explored the ways in which the goal of zero discharge of persistent toxic chemicals into the Great Lakes might be reached.

Project Administration

While the project is a joint one, CIELAP will be designated as the project administrator. In this context, CIELAP will be charged with the responsibility of receiving and disbursing funds according to the terms and conditions of the grant monies.

Project Management

The project will be jointly managed in a cooperative and interactive way. Both CIELAP and Pollution Probe will have a designated "project manager," who, in turn, will be responsible for the project within their respective organizations. As such, the two project managers will operate as co-managers of the project, and provide the overall guidance and direction to the project. The project managers will have the following responsibilities:

* develop workplans for each organization to ensure that the objectives of the project and its components are fulfilled;
* coordinate the workplans between the two organizations;
* cooperatively develop a strategy to further the recommendations of the report both in the private and public sectors;
* oversee and review the execution of project components, including the supervision of in-house and contract personnel;
* seek and consider guidance from the advisory committee of the project; and
* provide periodic progress reports of the project.

5. Workplans and Timelines

The following tables envision the workplan of the major components of the project, assuming the project starts in February of 1993.

Table 1
The Law and Policy Program Workplan

Date	Work Undertaken
Feb. 1993	Initiation of working papers
Feb. 1994	Completion of working papers
Mar. 1994	Workshop on Interim Report
Aug. 1994	Release Interim Report
Oct. 1994	Workshop on Final Report
Jan. 1995	Publish Final Report

Table 2
The Outreach Program Workplan

Date	Work Undertaken
Feb. 1993	Initiate work on project brochure
	Begin newsletter
	Initiate work on information packages
June 1993	Release brochure
	Publish 1st. issue of newsletter
Oct. 1993	Publish 2nd. issue of newsletter.
Feb. 1994	Release working papers
	Release fact sheets #1 and 2
	Release information packages
	Publish 3rd. issue of newsletter
June 1994	Publish 4th. issue of newsletter
Aug. 1994	Release interim report
	Initiate work on primer
Oct. 1995	Publish 5th issue of newsletter
Jan. 1995	Release final report
	Release primer and fact sheets #3, 4 and 5
Feb. 1995	Publish 6th. issue of newsletter

6. BIOTECHNOLOGY PROJECT BUDGET PROPOSALS

YEAR 1, February 1, 1993, through January 31, 1994

Research materials & journals	8,000		
Computer equipment & software	10,000		
Communications/PR	3,600		
Photocopying	5,000		
Postage/courier	5,000		
Telephone/fax	7,000		
Office supplies	3,000		
Travel	6,000		
Rent	18,000		65,600
Working Papers, research/writing	75,000	(60 days each)	
Working Papers, production	10,000		
Working Papers, distribution	5,000		90,000
Brochure, research/writing	2,000	(8 days)	
Brochure, production	1,000		
Brochure, distribution	1,000		4,000
Newsletter, research/writing x 3	6,000	(8 days each)	
Newsletter, production x 3	3,000		
Newsletter, distribution x 3	3,000		
Newsletter, electronic	4,500		16,500
Fact Sheets, research/writing x 2	6,000	(12 days each)	
Fact Sheets, production x 2	1,000		
Fact Sheets, distribution x 2	2,000		9,000
Project Management, Exec. Dir.	20,000		
Res. Dir.	24,500		44,500
Administrative Support	30,000		30,000
SUB-TOTAL YEAR 1			**259,600**

YEAR 2, February 1, 1994, through January 31, 1995

Research materials & journals	3,500		
Computer equipment & software	3,000		
Communications/PR	3,600		
Photocopying	5,000		
Postage/courier	5,000		
Telephone/fax	4,000		
Office supplies	3,000		
Travel	10,000		
Rent	18,000		55,100
Fact Sheets, research/writing x 3	9,000	(12 days each)	
Fact Sheets, production x 3	1,500		
Fact Sheets, distribution x 3	3,000		13,500
Newsletter, research/writing x 3	6,000	(8 days each)	
Newsletter, production x 3	3,000		
Newsletter, distribution x 3	3,000		
Newsletter, electronic	4,500		16,500
Primer, research/writing	20,000	(80 days)	
Primer, production	8,000		
Primer, distribution	2,000		30,000
Interim Report, research/writing	25,000	(100 days)	
Interim Report, production	4,000		
Interim Report, distribution	2,000		31,000
Workshop, Room, coffee, meals	2,000		
Workshop, Travel, 8 x 800	6,400		
Workshop, Accommodation, 8 x 125	1,000		
Workshop, Transcript	1,000		10,400
Final Report, research/writing	30,000	(120 days)	
Final Report, production	6,000		
Final Report, distribution	2,000		38,000
Workshop, Room, coffee, meals	2,000		
Workshop, Travel, 8 x 800	6,400		
Workshop, Accommodation, 8 x 125	1,000		
Workshop, Transcript	1,000		10,400
Project Management, Exec. Dir.	20,000		
Res. Dir.	24,500		44,500
Administrative Support	30,000		30,000
SUB-TOTAL YEAR 2			**279,400**
PROJECT TOTAL			**539,000**

BUDGET EXPLANATIONS AND JUSTIFICATIONS

All research and writing is at the standard CIELAP Research Associate rate of $250/day.

Research materials: This will include the purchase of books and reports. Subscriptions of journals, newsletters, other print material and conference fees are also included. It is expected that research costs will be significantly lower in the second year of the project.

Computers: The purchase of new computers and software for researchers is included in this item. Maintenance and repairs costs are also accounted for. The second year of the project will demand fewer resources for computers, which is reflected in the budget.

Photocopying: This will include the copying of materials for research purposes, in addition to drafts of working papers to be circulated among project staff and the advisory committee. Copies of financial and administrative records for the project is also included. Photocopy costs are expected to be about the same for both years.

Telephone/fax: This item includes estimates of the costs of long-distance calls and faxes to jurisdictions under examination, including Western Europe. As opportunities for research trips will be limited, telephone contact will be the principal means of conducting interviews with government officials and industry members. Telephone costs are expected to be reduced during the second year of the project because the out-of-town research activities will be essentially finished.

Office supplies: This includes standard office materials such as paper, printer ribbons, fax paper and others. Costs for office supplies are expected to be the same for both years of the project.

Travel: Travel costs include those associated with obtaining research materials, participating in conferences and undertaking speaking engagements. It is expected that travel cost will significantly increase during the second year as more outreach engagements will take place.

Rent: This rent of office space is based on 50% of CIELAP's rent, and on covering the costs of two small offices at Pollution Probe.

Working papers: It is anticipated that it will take 60 days to

complete each working paper, including editing services. This estimate is based on experience with the Program for Zero Discharge. Publication costs are approximately $2,000 per working paper and includes desk-top publishing and printing 1,000 copies. Distributing each working paper is estimated at $1,000 each.

Brochure: The writing of the brochure is expected to relatively straight-forward, taking no more than 8 days including editing services.

Newsletters: This includes the time of putting together and editing the various articles, desk-topping the newsletter, printing it and distributing it. Converting each newsletter into its electronic form is expected to cost about $1,500, including the costs of accessing the computer network.

Fact Sheets: These costs include editing and desk-top services.

Primer: This includes costs for writing, editing, desk-topping, lay-out and a good quality print run.

Workshops: It is anticipated that the travel and accommodation costs must be borne for non-governmental invitees.

Project Management: Executive Director - project administration, especially financial management and coordination, and overall direction; $400/day for about 50 working days.
Research Director - providing project oversight, proofreading and editing, directing and coordinating work of project researchers; $350/day for approximately 70 working days. These costs add up to $45,000/year.

Administrative support: This includes secretarial services, reception, responses to requests for information and correspondence.

7. THE CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW AND POLICY

Founded in 1970, CIELAP is an independent, non-profit research and educational organization incorporated under the laws of Ontario and registered with Revenue Canada as a charitable institute. CIELAP's goals are to identify emerging environmental issues, analyze current environmental policy questions, and undertake research and evaluate possible legal and policy responses for the public and private sectors. The results of these efforts are then to be communicated to decision-makers in the public and private sectors in a clear and non-partisan manner. CIELAP seeks to be at the leading edge of environmental law and policy research in Canada.

CIELAP has been in the forefront of legal and public policy research regarding the environmental aspects biotechnology applications in Canada since the emergence of the issue in the early 1980's. CIELAP hosted a conference on the Regulation of Biotechnology in Canada in 1984, and prepared the two-volume study Biotechnology Policy Development, for the Ontario Ministry of the Environment in 1988.

CIELAP's current projects include work in the areas of contaminated site remediation and environmental liability, energy and sustainable development, solid waste management, hazardous waste reduction, and the economic benefits of environmental protection. CIELAP's past work has included major research projects and publications in the fields of environmental assessment, air and water pollution control, hazardous and municipal solid waste management, hazardous substances, environmental rights and legal issues related to regulatory offenses. The Institute has also hosted and facilitated a conferences on a wide range of environmental law and policy issues.

8. THE POLLUTION PROBE FOUNDATION

Founded in 1969, Pollution Probe is one of Canada's leading environmental organizations. Over the years Pollution Probe has worked to ensure the health of Canadians through the reduction of the amounts of industrials wastes and toxic chemicals produced by our society. In addition, Pollution Probe has sought to conserve agricultural lands and to protect Canada's natural heritage. Pollution Probe is also seeking to address world-wide environmental issues, such as global warming and ozone depletion.

Pollution Probe has worked with Canada's leading environmental scientists, researchers and lawyers in the development of its recommendations on these issues. The organization is committed to ensuring that its positions are based on thorough and accurate research. Further, Pollution Probe has not simply pointed out environmental problems. It has attempted to provide practical solutions as well.

Over the years Pollution Probe has built positive working relationships with governments and industry. The organization has served on dozens of committees and working groups, participating in the development of new laws and policies, and looking for innovative solutions to our common problems.

In addition to its participation in the development of environmental law and policy, public educations has been a central aspect of Pollution Probe's activities. Books, fact sheets and information packages have been developed to address a wide range of Canadian and international environmental issues. Furthermore, Pollution Probe staff regularly make presentations to conferences, workshops and schools on environmental subjects. The organization also has organized specialized conferences on such subjects as energy conservation and waste management.

Pollution Probe has been working on the environmental issues related to biotechnology applications for a several years, and will combine its research and public education skills with those of CIELAP to provide a comprehensive research and education program on the issue in Canada.

9. PROJECT PERSONNEL

(Curriculum Vitae attached)

Anne Mitchell, Executive Director, CIELAP

As Executive Director of CIELAP, Ms. Mitchell will be responsible for over-all project administration and, in particular, its financial management. Ms. Mitchell has a wealth of experience in organizational and large-scale project Management.

Dr. Mark Winfield, Research Director, CIELAP

Dr. Winfield will be designated as CIELAP's project manager. In that capacity, he will organize and supervise the research components of the project. In addition, Dr. Winfield has primary responsibility for the drafting of the first working paper and will participate in the drafting of the project final report. Dr. Winfield has recently completed a Ph.D. in Political Science at the University of Toronto. He is also an instructor in the Environmental Studies Program at Innis College at the University of Toronto.

Paul Muldoon, Counsel and Director of Programs, Pollution Probe Foundation and Research Associate, CIELAP

Mr. Muldoon co-ordinates the law and policy reform and research agendas as Counsel to Pollution Probe. He has written a number of books, articles, and reports pertaining to a variety of environmental problems, and in particular, toxic water pollution, biotechnology, water conservation and environmental rights. He has graduate degrees in political science and law from McMaster University and McGill University respectively. In the past, he has also represented a number of environmental groups in regulatory and judicial hearings. Mr. Muldoon is an instructor of Environmental Law at the University of Toronto.

Burkhard Mausberg, Researcher, Pollution Probe Foundation and Research Associate, CIELAP

Mr. Mausberg works on issues related to biotechnology, toxic substances and Great Lakes, primarily for Pollution Probe, but also for CIELAP. In this capacity, he wrote several papers and reports on water quality issues, biotechnology and a Green Tour Guide for the Greater Toronto Area. He studied Chemistry at the University of Waterloo and Environmental Science the University of Toronto. Currently, Mr. Mausberg is completing a Masters of Environmental Studies at the University of Waterloo. Mr. Mausberg is a teaching assistant for environmental law and environmental economics at the University of Toronto and for environmental assessment at the University of Waterloo.

APPENDIX A BIOTECHNOLOGY: THE ISSUES AND THE ACTORS

The Biotechnology Industry in Canada: A Profile

Over the years, Canada has gained a reputation for the application of traditional biotechnologies in the development of such products as hardy winter wheat, highly productive dairy cattle and paediatric vaccines. Although Canadian firms were slow to adopt the new genetic techniques, the industry has made significant progress since the early 1980's.

The Canadian biotechnology industry is highly diverse. Almost half of Canada's biotechnology firms are in resource-based sectors such as forestry, fishing, agriculture and chemicals. Approximately one-third of the industry is focused in the health care sector. Biotechnology companies are also active in the fields of environmental protection and energy production. More than two-thirds of the Canadian biotechnology industry is located in Ontario (approximately 35%) and Quebec (approximately 25%).[8]

Existing and Emerging Biotechnology Applications[9]

Health Care

Human insulin was the first product created through genetically engineered micro-organisms to reach the commercial market, appearing in the early 1980's. Since then, an enormous amount of product research and development has occurred, especially as large pharmaceutical companies and entrepreneurial biotechnology firms have merged their operations. Indeed, never have so many revolutionary therapies come into the marketplace in so short a time. Applications in the health field have included disease treatment, and the development of vaccines and diagnostic products. Products for such diseases as Haemophilia, Hepatitis C, Diabetes, AIDS, and cancer also have been introduced.

Until the mid 1980's, there was no strong Canadian presence in the international pharmaceutical industry. However, this situation is changing rapidly as Research and Development spending by patent-holding drug companies in Canada has tripled over the past three years, to a total of $281.3 million for 1991. This intense growth is expected to continue over the next few years.

Forestry

Canadian forestry companies are currently undertaking biotechnology research in three main areas. These are pulp and paper manufacturing, the regeneration of harvested forests, and the protection of existing and new forests. In the pulp and

paper sector, research is under way into new enzyme technologies, allowing for significant reductions in the use of chemical bleaching agents. Research into techniques related to reforestation is being pursued vigorously in a number of laboratories across Canada. Methods have been developed to rapidly produce thousands of genetically-improved trees. This is to facilitate faster reforestation. In addition, researchers at Forestry Canada are developing technologies for biological pest control as alternatives to synthetic chemical treatments.

Environmental Protection

It has been suggested that waste treatment will be the largest market for biotechnology applications. The Canada Centre for Inland Waters in Burlington, Ontario and the National Research Council's Biotechnology Research Institute in Montreal, Quebec have extensive programs oriented toward the application of biotechnology for the treatment of municipal and industrial waste water. The use of bio-engineered organisms to clean-up contaminated sites also has been proposed.[10]

Agriculture and Food

Biotechnology has the potential to affect almost all aspects of crop and animal production in the agricultural sector. Current examples of biotechnology applications in Canadian agriculture include the improvement of crop nutritional and growth characteristics and the strengthening of crop resistance to pests and pesticides. Efforts to develop means of fighting chronic cattle diseases such as shipping fever and bovine virus diarrhoea are also being made. Projects are under way to improve the hardiness of winter wheat as well. Other potential applications in the agricultural field include the development of biopesticides and animal growth promotants.[11]

The Environmental Risks Associated with Biotechnology Applications

Clearly, biotechnologies, especially the new genetic engineering techniques, have the potential to be extraordinarily powerful tools, capable of bringing substantial benefits to human beings. However, these technologies also have the potential to cause significant environmental damage. The environmental risks posed by biotechnologies are likely to be particularly difficult to address effectively, as the products of genetic engineering are living organisms. As such, they can multiply, spread, mutate, and transfer genetic information to other organisms. Consequently, the environmental risks posed by biotechnology are fundamentally different from those posed by toxic chemicals or

radioactive substances.

Specific studies on the nature and degree of environmental and health risks posed by biotechnology applications have been undertaken by a number of bodies, including the Organization of Economic Cooperation and Development (OECD),[12] the United States Congress Office of Technology Assessment,[13] the United States National Academy of Sciences[14] and the Ecological Society of America.[15] No formal research on the subject has been undertaken by any Canadian government agency to date. Rather, Canadian officials have chosen to upon draw work from the United States and Europe.

Many of the potential risks associated with biotechnology applications which have been identified can be described as being of a "low probability, high consequence" character. Simply put, it is unlikely that something will go wrong, but if it does, the consequences are likely to be extremely serious. The specific environmental risks associated with biotechnology fall into two broad categories. The first group arises from the immediate consequences of the release of genetically engineered organisms into the environment. The identification of these risks is an extension of past experiences with the introduction of "exotic" species, such as zebra mussel and the purple loosestrife, into existing ecosystems. This category of risks includes:

* competition with, or the replacement of, established species by genetically engineered organisms;

* the unrestrained growth of introduced organisms due to the lack of natural enemies;

* the unexpected infectivity, pathogenicity or toxicity of introduced biological agents;

* the infectivity, pathogenicity, or toxicity of introduced organisms to non-target organisms;

* the transfer of genetic traits to unintended recipients; and

* the modification of natural cycling processes, such as the nitrogen and sulphur cycles by genetically engineered organisms.

The second set of environmental risks related to biotechnology applications are longer-term in nature. They include:

* the loss of biodiversity as, for example, the genetic base of crops is narrowed and focused on engineered genotypes; and

* the long-term implications of specific applications, such as the likely results of the development of herbicide and pesticide resistant crops, in terms of total herbicide and pesticide use.

Underlying all of these risks is the degree of scientific uncertainty which surrounds genetic engineering applications. In some instances, scientists do not know how a particular gene is expressed, or which cellular processes are affected by a certain enzyme. This makes the results of experiments and applications of genetic engineering technologies difficult to predict with high confidence.

The Legal and Policy Framework Governing Biotechnology in Canada

The regulation of biotechnology has the potential to develop into an extremely complex area of law. In Canada, the question is particularly difficult as a result of the division of legislative jurisdiction over biotechnology between the federal and provincial governments. To date, Canadian governments have taken the view that biotechnology should be regulated through existing legislation. Canadian governments are attempting to "fill the gaps" in existing laws rather than developing comprehensive regulatory regimes.

Given the potential complexity of biotechnology regulation, it is not at all clear that this approach will be adequate to ensure the protection of the public interest in the development and application of these technologies. Indeed, the result to date has been to involve no less than 17 federal agencies in regulatory issues related to biotechnology through a wide range of statutes. A similar pattern is likely to emerge at the provincial level over the next few years. 46 agencies in the ten provinces have already identified biotechnology as a subject which will affect their regulatory mandates. This situation has led to confusion among government officials, the biotechnology industry and the public regarding regulatory requirements and responsibilities.

This outcome emphasizes the need for a complete review and rationalization of the environmental regulatory regime for biotechnology applications in Canada. The biotechnology industry and several federal and provincial government agencies have examined different aspects of regulation biotechnology. However, no comprehensive assessment has been undertaken. The project being proposed by CIELAP and Pollution Probe will fulfil this need.

Existing Canadian Federal Law and Policy

The question of the regulation of biotechnology has only

emerged as a public policy issue in Canada over the past ten years. Guidelines for laboratory applications to recombinant DNA technologies were introduced by the Medical Research Council and the National Research Council in 1978. However, these only apply to federal government operated or funded facilities. Since then, the primary focus of the Government of Canada has been to promote the growth of the biotechnology industry.

A National Biotechnology Strategy was introduced by the Ministry of State for Science and Technology in 1983. This industrial development strategy targeted commercial applications of biotechnology in health care, mining and mineral leaching, plant strain development, nitrogen fixation, cellulose utilization, and waste treatment. Under the National Strategy, a National Biotechnology Advisory Committee[16] was formed to advise the Minister of State for Science and Technology on issues related to the subject. In addition, a Federal Interdepartmental Committee on Biotechnology was created to examine regulatory issues related to biotechnology applications. A National Biotechnology Coordination Office has been established in the Department of Industry, Science and Technology.[17]

A research infrastructure has been developed as a component of the biotechnology industrial strategy. In 1984, the National Research Council launched a Biotechnology Program. This program currently coordinates the work of four institutes, the Biotechnology Research Institute in Montreal, the Plant Biotechnology Institute in Saskatoon, the Institute for Biological Sciences in Ottawa and the Institute for Marine Biosciences in Halifax.

As the Canadian industry started to emerge, regulatory concerns began to be expressed. CIELAP, in particular, made considerable efforts in the mid-1980's to draw attention to the need for a review of the existing regulatory structure.[18] The National Biotechnology Advisory Committee also identified several issues that required changes in both private sector decision-making and public policy.

The National Advisory Committee was especially concerned that new products be regulated on the basis of their proposed uses, and their category of risk, rather than on an assumption that every biologically-based product or process constitutes a risk. Under the committee's proposal, the onus would be on those who seek to challenge the application of biotechnologies to prove the existence of substantial risks, rather than on proponents to demonstrate them safe. The committee also identified a need to harmonize canadian regulatory requirements and approval systems with those in Europe and the United States.[19]

An Hoc Committee on Environmental Release was formed in 1987 under the auspices of the Federal Interdepartmental Committee on

Biotechnology to address issues related to the deliberate release of genetically-engineered organisms into the environment. In December of that year a proposed regulatory scheme was issued for consultation. No action further was taken on these proposals, pending the completion of the development of the Canadian Environmental Protection Act (CEPA). Consideration was given to the inclusion of comprehensive biotechnology provisions CEPA.

The federal government ultimately determined that it was preferable to regulate biotechnology through existing law. Most of the statutes relevant to this approach are administered either by Agriculture Canada and or Health and Welfare Canada, rather than Environment Canada.[20] The result was that when CEPA was enacted in 1988, Environment Canada was only empowered to regulate biotechnology products not covered by other legislation. Regulatory responsibilities continued to be divided and shared between several agencies.

In December, 1990, the Government of Canada released its "Green Plan" outlining its environmental agenda for the following five years. In the plan, the government recognized the potential economic and environmental benefits resulting from biotechnology applications. At the same time, it stated that "with the benefits come potentially significant risks to human health and the environment."[21] As a result, the federal government committed itself to a national regulatory regime to address the environmental risks of the biotechnology industry.

The proposed system is to include national standards and codes of practice to prevent problems arising from the accidental or deliberate release of genetically engineered microorganisms into the environment. Regulations are to be developed under CEPA requiring the proponent to notify Environment Canada when the release into the environment of a new biotechnology product is planned.[22] The federal government set 1995 as the deadline for the introduction of these regulations. A draft regulation was released in the fall of 1992[23].

The continuing delays in the introduction of federal regulations and ongoing confusion regarding administrative responsibilities recently have been criticized by the National Biotechnology Advisory Committee. The committee stated in 1991 that:

> "Federal regulations are a critical determinant of the cost and time required to bring a new biotechnology product to market. Current delays and regulatory uncertainties are discouraging new research and investments in commercial facilities, driving up the costs of innovation and undermining public confidence."[24]

The effective and efficient regulation of biotechnology presents the government of Canada with a number of serious difficulties. These challenges must be met if the application of biotechnology in Canada is to support the goal of sustainable development. The proposed joint CIELAP/Pollution Probe biotechnology research program could play a major role in the shaping of the federal regulatory agenda for biotechnology towards that end.

Provincial Law and Policy

The history of the provincial regulatory development governing biotechnology is a relatively short one. As has been the case at the federal level, the focus has been on promoting the technology as a component of industrial development strategies. The establishment of environmental protection procedures has received little attention. This is despite the consideration that no provincial environmental protection statute currently in force in Canada contains explicit provisions related to biotechnology applications.

In addition, in the absence of a more strategic approach, responsibilities may become divided among agencies within each province. There is also the possibility that individual provinces will adopt very different regulatory approaches. Such developments would result in further uncertainty regarding regulatory requirements among governments, the industry and the public.

Ontario

Ontario has been one of the centres of the expanding biotechnology industry and was the first province to show a regulatory interest in the issue. In 1989, the government of Ontario decided to convene a multi-agency advisory committee to produce a green paper on biotechnology. The resulting paper, Biotechnology in Ontario - Growing Safely, was released in September, 1989. The industry and interested members of the public responded to the paper with submissions through the fall of 1989 and spring of 1990. The Ontario government has not, to date, formally responded to these comments.

In early 1990 two staff members were assigned to examine biotechnology issues by the Ontario Ministry of the Environment. However, the Ministry has yet to develop a regulatory framework for biotechnology. In the interim, provincial officials have indicated an intention to regulate biotechnology applications through existing legislation. The Environmental Protection Act, the Ontario Water Resources Act, the Pesticides Act and the Environmental Assessment Act will be of particular significance in this sense.

The Ontario Premier's Council of Health, Well-Being and Social Justice noted the need for the development of a comprehensive regulatory strategy for biotechnology in its August, 1991 report Objectives and Targets for Ensuring a Safe, High Quality Physical Environment. The council recommended that the onus of responsibility be placed on producers and that they be required to maintain parent stocks. The council also argued for the development of emergency response guidelines, educational and awareness programs for industry and consumers and a research program to determine product impacts on human health and the environment. The Ontario government has not indicated how it will respond to the council's recommendations.

Alberta

The province of Alberta also has taken an interest in the biotechnology issue. The proposed Alberta Environmental Protection and Enhancement Act, (Bill 23) which is expected to be enacted before the end of the spring, 1992 session of the Alberta Legislature, includes enabling provision for the regulation of biotechnology applications. A biotechnology task force is to be formed, consisting of representatives of industry, government and environmental groups to assist in the drafting of a biotechnology regulation under the proposed Act. The Alberta government is giving particular attention to the role of municipalities in the management of the uses of biotechnology.

Other Provinces

There has been less interest in biotechnology regulation among the other provinces. British Columbia may examine the issue in detail as part of the wide-ranging review of its environmental protection statutes currently taking place. Additional provinces are likely to begin to show interest in the question as public awareness of biotechnology rises. Indications from the federal government that it intends to take concrete action in the field also may prompt provincial responses.

The provincial component of the CIELAP/Pollution Probe will assist all of the provinces in establishing frameworks for the development of their regulatory strategies for biotechnology. In this way, it will help to ensure a degree of consistency across Canada in the regulation of biotechnology applications, while promoting the protection of environmental quality.

APPENDIX B: SUMMARY OF BIOTECHNOLOGY POLICY DEVELOPMENT ACTIVITIES IN CANADA

Alberta: The government of Alberta is developing regulations to address biotechnology applications under the newly enacted Alberta Environmental Protection and Enhancement Act.

Ontario: The Ontario government released a Green Paper on Biotechnology, entitled, "Biotechnology in Ontario: Growing Safely," in 1989. Public responses to the Green Paper are still under review. In the meantime, the Biotechnology Unit of the Ontario Ministry of the Environment is developing protocols for uses of biotechnology products.

Federal: The federal government currently has several initiatives underway:

(1) Environment Canada is developing a biotechnology regulation under the Canadian Environmental Protection Act, dealing with the notification of new biotechnology products;

(2) Health and Welfare Canada has recently announced its intention to develop regulations under the Food and Drug Act, for novel foods and novel food processes;

(3) Agriculture Canada is developing regulations under the Plant Breeders' Rights Act, dealing with the patenting of certain species of plants; and

(4) the National Advisory Committee on Biotechnology continues to make reports and recommendations to the Minister of Industry, Science and Technology regarding the development of the biotechnology industry in Canada.

APPENDIX C: BIOTECHNOLOGY PRODUCT GUIDE TO FEDERAL LAWS & AGENCIES

Biotechnology Products/Organisms	Relevant Laws and Regulations	Applicable Agencies
Animal Pathogens Veterinary biologics Animal products and by products	Health of Animals Act and Regulations	Agriculture Canada
Feeds and Feed Additives	Feeds Act and Regulations	Agriculture Canada
Fertilizers/ Supplements	Fertilizers Act and Regulations	Agriculture Canada
Foods and Food Additives	Food and Drugs Act and Regulations	Health and Welfare Canada
Medical Devices	Food and Drugs Act and Regulations	Health and Welfare Canada
Pest Control Agents	Pest Control Products Act and Regulations	Agriculture Canada Health and Welfare Canada
Food and Drugs	Foods and Drugs Act and Regulations	Health and Welfare Canada
Plant Pests	Plant Protection Act and Regulations	Agriculture Canada
Plants/Seeds	Seeds Act and Regulations	Agriculture Canada
Consumer Products	Hazardous Products Act and Regulations	Health and Welfare Canada
Chemical Products	Canadian Environmental Protection Act and Regulations	Environment Canada Health and Welfare Canada
Other Products (Pollution Control) (Mineral Leaching) (Chemical Residue Destruction) (Waste Disposal) (Uses not elsewhere Covered)	Canadian Environmental Protection Act and Regulations	Environment Canada Health and Welfare Canada

Adopted from: Government of Canada, Bio-Tech Regulations - A User's Guide (Ottawa: Ministry of State for Science and Technology Canada, Agriculture Canada, Environment Canada, Health and Welfare Canada, 1991)

ENDNOTES

1.R.L. Sinsheimer, "The Presumptions of Science," Daedelus, 1978

2. R.H. Gutherie, "D.N.A. Technology: Are We Ready?" (1981) 6 Dalhousie Law Journal, 569.

3.See, for example, R. J. Goldberg, "Should the Development of Herbicide-tolerant plants be a Focus of Sustainable Agriculture Research?" in J. Fressenden MacDonald, ed., Biotechnology and Sustainable Agriculture: Policy Alternatives, (Ithaca New York: National Agricultural Biotechnology Counci,l 1989), pp. 103-110.

4.See, for example, J. Rifkin, Algeny - A New Word, A New World, (Harmondsworth: Penguin, 1983).

5.See, for example, Biotechnology: Economic and Wider Impacts, (Paris: Organization for Economic Cooperation and Development (OECD), 1989), and Biotechnology and the Changing Role of Government, (Paris: OECD, 1988).

6.See, for example, S. Shaperio, "Biotechnology and the Design of Regulation, Ecology Law Quarterly, 17:1-70, no. 1, 1990.

7.See, for example, C.J. Ruetsch and T.R. Broaderick, "New Biotechnology legislation in the European Community and the Federal Republic of Germany," International Business Lawyer, 18:408-11, October 1990. See also E. Yoxen, Scenarios for Biotechnology in Europe: A Research Agenda, (Brussels: European Foundation for the Improvement of Living, 1990).

8.Ernst and Young Consultants, Canadian Biotech '92: Towards Realization, (Ottawa: Winter House Scientific Publishers, 1992).

9.For a general review of potential biotechnology applications see Beak Consultants Ltd., Review and Evaluation of Products and Applications of Biotechnology in Ontario, (Toronto: Ontario Ministry of the Environment, 1991).

10.See, for example, J.M. Thomas, Leaking Underground Storage Tanks: Remediation with Emphasis on in situ Bioremediation, (Ada Oaklahoma: National Centre for Groundwater Research Kerr Environmental Research Laboratory, 1987).

11.See MacDonald, ed., Biotechnology and Sustainable Agriculture: Policy Alternatives, for a general discussion of potential biotechnology applications in agriculture.

12.Recombinant DNA Safety Considerations: Safety Considerations for Industrial Agricultural and Environmental Applications of Organisms Derived by Recombinant DNA Techniques, (Paris: OECD, 1986).

13.See Office of Technology Assessment, United States Congress, New Developments in Biotechnology: Field Testing Engineered Organisms: Genetic and Ecological Issues, 34 (1988).

14.National Academy of Sciences, The Introduction of Recombinant DNA-Engineered Organisms into the Environment: Key Issues, (14-14, (1987) and National Academy of Sciences, Field-Testing Genetically Engineered Organisms: Framework for Discussions, 124, (1989).

15.Ecological Society of America, "The Release of Genetically Engineered Organisms: A Perspective from the Ecological Society of America," 70 Ecology, 1989).

16.The committee currently has 27 members, including representatives of the biotechnology industry, universities, banks and venture capital firms, hospital researchers, the legal community, and resource development firms.

17.The Department of Industry, Science and Technology was created in 1987 through the amalgamation of the Department of Industry, Trade and Commerce and the Ministry of State for Science and Technology.

18.See Biotechnology Policy Development: 2 Volumes, (Toronto: Canadian Institute for Environmental Law and Policy, 1987).

19.The National Advisory Committee on Biotechnology, Annual Report 1987-88: The Regulation of Biotechnology: A Central Issue for Canadian Research and Industrial Development, (Ottawa: Department of Industry, Science and Technology, 1989).

20.See Appendix C.

21.Canada's Green Plan: Canada's Plan for a Healthy Environment, (Ottawa: Supply and Services Canada, 1990), p. 50.

22.Ibid., p. 50.

23.See Draft New Substances Notification Regulations for Biotechnology Products (Part III) Under the Canadian Environmental Protection Act: Microorganisms, Biopolymers and Biochemicals (Ottawa: Environment Canada and Health and Welfare Canada, October 1992).

24.National Biotechnology Advisory Committee, National Biotechnology Business Strategy: Capturing Competitive Advantage for Canada, (Ottawa: Industry, Science and Technology Canada, 1991), p. 2.

ATTACHMENTS

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EDUCATION

1991 – present	University of Waterloo, Waterloo, Ontario. – Masters of Applied Environmental Studies.
1988 – 1991	University of Toronto, Toronto, Ontario. – Bachelor of Science, specialist in Environmental Science.
1984 – 1987	University of Waterloo, Waterloo, Ontario. – Completed three years of Co-operative Chemistry.

AWARDS AND MEMBERSHIPS

1985, 1986	University of Waterloo Senate scholarships
1987	Dean's Honours List (U. of W.)
1989	Sotherton Wadhams Scholarship (U. of T.)
1989	Douglas Pimlott Scholarship (U. of T.)
1990	Dean's Honours List (U. of T.)
1991	Graduated with High Distinction (U. of T.)
1992	Innis College Recognition Award (U. of T.)
1992	Board Member, Canadian Environmental Law Association
1992	Member, Innis College Council, University of Toronto

WORK EXPERIENCE

1992 – present — University of Waterloo, Waterloo, Ontario.

Teaching assistant for second-year environmental assessment course.

1991 – present — University of Toronto, Toronto, Ontario.

Teaching assistant for fourth-year environmental law course and fourth-year environmental economics course.

1990 – present — Pollution Probe, Toronto, Ontario.

Researcher.

1989 – present
The Canadian Institute for Environmental Law and Policy, Toronto, Ontario.

Research associate.

1990 –
The Toronto Environmental Alliance, Toronto, Ontario.

Researcher and writer.

1987 – 1990
CKLN–FM Radio INC., Toronto, Ontario.

Host and producer.

1987 –
Atmospheric Environment Service, Environment Canada, Toronto, Ontario.

Research assistant.

Employment in the chemistry field included research positions with the Ontario Ministry of Northern Development and Mines, Sternson Ltd. of Brantford, Ontario, and Roxul Inc. of Milton, Ontario.

PUBLICATIONS

Burkhard Mausberg, 1992. "Secrecy in Biotechnology: Why Public Scrutiny in Needed," Canadian R&D Manager, Vol. 1, No. 4.

Susan Sang with Burkhard Mausberg, 1992. Developing Options for Technology–Based Standards for the Pulp and Paper Industry in the Great Lakes Basin, (Toronto: The Canadian Institute for Environmental Law and Policy), 60 pages.

Burkhard Mausberg and Kathleen Taylor, 1991. "The Impact of Urban Air Pollution on the Built Environment," Momentum 1991, (Ottawa: the International Council on Monuments and Sites).

Burkhard Mausberg and Andrea Imada, 1991. "An Examination of the Ecological Impacts of the Deep Lake Water Cooling System on Nearshore Ecosystems," in Richard Gilbert [ed.], Deep Lake Water Cooling, (Toronto: The Canadian Urban Institute).

Burkhard Mausberg, 1991. "Acid Rain: What goes up...." Harrowsmith Magazine, Vol. 16, No. 4.

Karen Valihora and Burkhard Mausberg, 1991. GREEN TOURS: A Guide to the Environmentally Important Sites for the Greater Toronto Area. (Toronto: Toronto Environmental Alliance), 79 pages.

Burkhard Mausberg, 1990. Still Going for BAT for Water Quality? A Four-Year Review of the Ministry of the Environment's Municipal/Industrial Strategy for Abatement (MISA), (Toronto: The Canadian Institute for Environmental Law and Policy and the Pollution Probe Foundation), 97 pages.

Paul Muldoon, Marcia Valiante, Carole St. Laurent and Burkhard Mausberg, 1990. "Stewardship and Accountability," in Environment in Transition, (Toronto: the Royal Commission on the Future of the Toronto Waterfront).

SELECTED PRESENTATIONS, BRIEFS AND SPECIAL CONTRACTS

Sunsetting Hazardous Chemicals in Canada, invited speaker at the 39th Ontario Conference on the Environment, June 1992, Toronto, Ontario.

Societal Issues Surrounding Plant Biotechnology, invited speaker at the 3rd Canadian Conference of the International Association for Plant Tissue Culture, June 1992, Guelph, Ontario.

Genetically Engineered Organisms: What Should Be Released?, invited speaker at the Annual Meeting of the Canadian Science Writers' Association, May 1992, Waterloo, Ontario.

The Canada-Ontario Agreement on Great Lakes Water Quality: The Role of the Public and Issues for Discussion, co-written by Paul Muldoon, the Pollution Probe Foundation, June 1991, 13 pages.

A Sunset Chemicals Protocol for the Great Lakes: Implementing Zero Discharge through Pollution Prevention, co-written by Paul Muldoon, presented at the 34th Annual Meeting of the International Association for Great Lakes Research, June 1991.

A Sunset Protocol for Ontario, keynote speaker at the Annual General Meeting of the Association of the Chemical Profession of Ontario, April 1991.

Remedial Action Plans under the Great Lakes Water Quality Agreement: A Programmatic Audit, co-written by Paul Muldoon, prepared for the Office of the Auditor General of Canada, April 1991, 73 pages.

Technology-Based Standards for the Pulp and Paper Industry in the Great Lakes, invited speaker at "Reducing the Use and Generation of Toxic Chemicals in Pulp and Paper Manufacturing Conference", Boston MA, March, 1991.

A Brief on the Pulp and Paper Industry: Chemical Warfare in Ontario, the Pollution Probe Foundation, February 1991, 15 pages.

RESUME

ANNE MITCHELL

148 RUSHOLME ROAD

TORONTO

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(416) 923-5949 (fax)

I have had 16 years management and administrative experience in the field of international development. I have experience in advocacy, fundraising, financial management, personnel management, problem solving, writing, media work and organizational development. I am known as a person who can be trusted, depended on and as one who can gather support for a cause from governments, professions, church groups, non-government organizations, interest groups, the public and volunteers. I have managed fundamental change in the beginnings, development, successful completion and re-orientation of non-government organizations. I enjoy the opportunity to work in a field where I can use my skills, experience and commitment to further the ideals in which I believe. I enjoy a challenge.

EXPERIENCE

Executive Director, Canadian Institute for Environmental Law and Policy - January 1992 - present - re-establish the organization in the forefront of research in environmental law and policy; establish the financial viability of the organization; develop an integrated operational plan for the organization to ensure it remains in the forefront of research on law and policy issues.

President, Canada - South Africa Cooperation - July 1991 - present - establishing the organization, negotiate funding; demonstrate its viability as a human rights organization in Canada supporting South African human rights organizations.

Executive Director, International Defence and Aid Fund for Southern Africa (Canada) - 1980 -June 30 1991 - set up structure; established systems including computer; negotiated funds; developed policy; prepared funding submissions, reports, position

statements, etc; represented the organization nationally and internationally to donors, governments, United Nations; managed and directed the organization through major period of change. In 1980 IDAFSA (Canada) had 100 supporters in Canada and a budget of $25,000. Ten years later it could count on 10,000 Canadians for support and its budget was $2,250,000.

Education Coordinator, Ngwane Rural Education Centre, Swaziland, Southern Africa, WUSC Volunteer - 1977 - 1979 - set up courses in basic skills for rural adults; participated in the day to day life of rural Swazis; assisted rural Swazis to access necessary resources to maintain their projects.

Education Coordinator, Ottawa/Hull Region Miles for Millions and Ottawa/Hull Learner Centre - 1975 - 1977 - developed education programs with teachers, including curricula unites for Ottawa Board of Education; developed community education projects.

Assistant, Program Funding, CUSO - 1974 - 1975 - assisted with direct mail fundraising campaigns and special event fundraising campaigns.

Teacher, Scotland - 1971 - 1974; 1971; 1966 - 1968 - taught business studies and economics to academic and non-academic students. Was involved in training programs in developing social skills for young adults. Participated in Confederation of British Industry program on problems for young people adapting to the work environment; participated in international school exchange program.

Group Counsellor, Boys Farm and Training School, Shawbridge, Quebec - 1969 - 1970 - based on group counselling techniques, developed individual programs for delinquant young people in an effort to change their behaviour.

EDUCATION

Master of Arts in International Affairs, Norman Paterson School of International Affairs, Carleton University, Ottawa - 1984

Diploma in Youth and Community Work, Moray House College of Education, Edinburgh - 1969

Teaching Certificate in Business Education, Moray House College of Education, Edinburgh - 1966

Diploma in Business Studies, Heriot-Watt College of Technology, Edinburgh - 1965

LANGUAGES

I am bilingual - English and French.

ASSOCIATIONS

Canadian Association of African Studies - member
Canada - South Africa Cooperation - president

OTHER RELATED INFORMATION

November 1991 - Canadian delegate to UN Centre Against Apartheid consultation with NGO's and Anti-Apartheid Groups, Geneva

February 1991 - fact finding visit to South Africa

July 1990 - fact finding visit to South Africa

September 1987 - headed a delegation of Canadians to attend the International Conference on Children, Repression and the Law in Apartheid South Africa held in Harare, Zimbabwe

May 1986 - represented Canadian Government at a United Nations seminar on assistance to peoples and movements struggling against colonialism, racism, racial discrimination and apartheid in Younde, Cameroon

May 1985 - fact finding visit to South Africa

April 1985 - attended a liberation support workshop in Lusaka

April 1976 - member, NGO delegation to the 7th Special Session of the United Nations, New York

PUBLICATIONS

Mitchell, Anne, "Should Sanctions be Lifted?", The Ottawa Citizen, June 29, 1991.

_____, "Whirlwind of Violence", The Globe & Mail, August 1990.

_____, "Children Under Apartheid", Legal Perspectives, May 1990.

_____, Future Scenarios in South Africa", presented to the annual conference of the Canadian Association of African Studies, Ottawa, May 1987.

_____, "Children Under Apartheid", Report from the International Conference on Children, Repression and the Law in Apartheid South Africa, Harare, fall 1987.

_____, Submission to the House of Commons Standing Committee on Human Rights, July 1986.

_____, "Alternate Tourist Guide to South Africa", The Globe & Mail, September 1985.

_____, IDAFSA (Canada) Annual Reports - 1981 - 1990.

_____, Various articles in IDAFSA (Canada)'s Newsletter - 1980-1990.

_____, Letters to the Editor, The Globe & Mail.

_____, Letters to the Editor, The Citizen.

Mitchell, Anne & McClure, Gordon, "Computer Technology: Its Role in Combatting Apartheid", presented to annual conference of Canadian Association of African Studies, Ottawa, May 1989.

Pratt, Renate & Mitchell, Anne, "The Obstacles to Independance in Namibia", presented to a conference of The United Nations Council for Namibia, Toronto, September 1988.

Anglin, Doug; Mitchell, Anne & Tillman, George, Submission to the Special Joint Committee of Parliament on Canada's International Relations, September 1985.

CURRICULUM VITAE

Paul Robert Muldoon, B.A., LL.B., M.A., LL.M.
(of the Ontario Bar)

48 Boustead Avenue
Toronto, Ontario

(H) (416) 604-1244
(W) (416) 926-1907

EDUCATION

Bar Admission Course
Law Society of Upper Canada, 1983-84
Call to the Bar of Ontario on April 10, 1984

McGill University (Institute for Comparative Law)
LL.M. (Masters of Law) - 1984
Specialization: International and U.S.-Canada Relations

McMaster University (Department of Political Science)
M.A. (Masters of Arts) - 1983
Specialization: International and U.S-Canada Relations

University of Ottawa (Faculty of Law)
LL.B. (Bachelor of Laws) - 1981

Wilfrid Laurier University (Department of Political Science)
Hons. B.A. (Bachelor of Arts) - 1978

EMPLOYMENT

September 1990 to Present	Part-time Faculty - Teaches course on Environmental Law, Institute for Environmental Studies, University of Toronto
April 1990 to Present	Programs Director and Counsel, Pollution Probe
December 1988 December 1991	Project Director, Program For Zero Discharge, Canadian Institute for Environmental Law and Policy
September 1989 to June 1990	Part-time Faculty, Trent University, Teach courses on environmental law and Great Lakes issues

September 1986 to Present	Lawyer/ Researcher Representing public interest groups before regulatory boards and other matters
September 1985 to August 1986	Recipient of "Private Scholar Research Grant" from Social Sciences and Humanities Research Council of Canada to study from a legal perspective the environmental dimension of foreign aid
April 1984 to September 1985	Research Associate Canadian Environmental Law Research Foundation, Toronto, Ontario
September to December 1983	Lecturer, Environmental Law Faculty of Continuing Studies, McGill Unversity, Montreal, Quebec

MEMBERSHIPS AND DISTINCTIONS

Member, MISA [Municipal-Industrial Strategy for Abatement] Advisory Committee - a provincial body which report to the Minister of the Environment on is water quality program

Member, Standards and Criteria Committee, Niagara River and Lake Ontario Toxic Management Plan [pursuant to the international "Four Party Agreement"]

Director at Large, Great Lakes United (a coalition of 150 environmental, health, labour groups from around the Great Lakes basin)

Member, Science Advisory Board, International Joint Commission.

Member, Virtual Elimination Task Force, International Joint Commission

Gold Medalist - Academic Achievement, Wilfrid Laurier University, 1978.

PUBLICATIONS AND OTHER WORKS

Paul Muldoon, "The International Joint Commission and Point Roberts: A Venture into a New Area of Concern" (M.A. Thesis, McMaster University, 1983).

Paul Muldoon, "Legal Controls of Acid Precipitation in the North American Context" (LL.M. Thesis, McGill University, 1984).

Paul Muldoon and Leslie Stalker, "Equal Access: Suing Polluters on their Own Turf" (1984), 12 Alternatives 12.

Paul Muldoon and David Scriven, "Intervention as Added Party: Rule 13 of the Ontario Rules of Civil Procedure" (1985), 6 Advocates' Quarterly 129.

Marcia Valiante and Paul Muldoon, "Biotechnology: A Regulatory Proposal" (1985), 23 Osgoode Hall Law Journal 359.

Paul Muldoon and David Scriven, "Intervention as Friend of the Court: Rule 13 of the Ontario Rules of Civil Procedure" (1986), 6 Advocates' Quarterly 448.

Marcia Valiante and Paul Muldoon, "An Overview of Canadian Law and Policy Governing Great Lakes Quantity Management" (1986), 18 Case Western Reserve Journal of International Law 109.

Paul Muldoon, with David Scriven and James Olson, Cross-Border Litigation: Environmental Rights in the Great Lakes Ecosystem (Toronto: Carswell, 1986).

Paul Muldoon, "The International Law of Ecodevelopment: Emerging Norms for Development Assistance Agencies" (1987), 18 Texas International Law Journal 109.

Paul Muldoon and David Scriven, "Principles for Ecosystem Regulation - A Discussion Paper" (Toronto: Canadian Environmental Law Research Foundation, 1987).

Paul Muldoon, "Air Pollution Controls in Canada and the United States: A Comparative Overview" in Environmental Law in Indonesia and Canada, (eds.) D. VanderZwaag, S. Mills and B. Patton (Halifax: School for Resource and Environmental Studies, 1987).

J. Ferretti, Paul Muldoon and M. Valiante, "CIDA's New Environmental Policy" Probe Post, Winter, 1987, 25.

Paul Muldoon and Andrea Jenkins, "Transboundary Emergency Planning: Information, Procedures, and Liability" (A Report submitted to the Ontario Nuclear Safety Review, September, 1987).

Paul Muldoon, "Ecosystem Managment: Overcoming Jurisdictional Diversity Through Law Reform" in Toxic Contamination in Large Lakes, Vol. IV: Prevention of Toxic Contamination in Large Lakes N.W. Schmidtke (ed.) (Chelsea: Mich.: Lewis

Publishers, 1988).

Paul Muldoon and Marcia Valiante, Zero Discharge: A Strategy for the Regulation of Toxic Substances in the Great Lakes Ecosystem (Toronto: Canadian Environmental Law Research Foundation, 1988).

Paul Muldoon, "The Fight for an Environmental Bill of Rights: Legislating Public Participation in the Environmental Decision-Making Process" (1988), 15 Alternatives 33.

Paul Muldoon and Marcia Valiante, Toxic Water Pollution in Canada: Regulatory Principles for Reduction and Elimination (Calgary: Canadian Institute for Resources Law, Faculty of Law, University of Calgary, 1989).

Paul Muldoon, "Ministry of Environment v. The City of Detroit et al. - Case Commentary" (1988), 2 Canadian Environmental Law Reports (N.S.) 320.

Paul Muldoon, Book Review - in Environments, vol. 20(2), pp. 90-91 (1988).

Paul Muldoon, The Law of Intervention: Status and Practice (Toronto: Canada Law Book, 1989).

Paul Muldoon and John Jackson, "What's Gone Before: The Draft Charter's Legal and Administrative Context" in P.G. Sly, D.M. Leith, and D.J. Waterston, (eds.), Towards and Ecosystem Charter for the Great Lakes - St. Lawrence (Ottawa: Rawson Academy of Aquatic Science, 1989).

Marcia Valiante and Paul Muldoon, "Annual Review of Canadian U.S. Relations" (1989), International Environmental Policy. vol. 1.

Jack Gibbons, Paul Muldoon, and Marcia Valiante, "Sustainable Development: Its Implications for Energy Policy in Canada" in Proceedings of the Conference - in The Legal Challenge of Sustainable Development, O. Saunders, (ed.) (Calgary: Canadian Institute of Resources Law, 1989)

Paul Muldoon, "The GRAND Proposal", in A.L.C. de Menstral and D.M. Leith, (eds.), Canadian Water Exports and Free Trade (Ottawa: Rawson Academy of Aquatic Science, 1989).

Marcia Valiante and Paul Muldoon, "Annual Review of Canadian U.S. Relations" (1990), International Environmental Policy, vol. 2.

Paul Muldoon et al. "The Regulatory Context" in the Royal Commission on the Future of the Toronto Waterfront, 1990.

Paul Muldoon, "A Pollution Prevention Strategy for Canada", in Sustainable Development in Canada: Options for Law Reform, (Ottawa: Canadian Bar Association, 1990).

Franklin Gertler, Paul Muldoon and Marcia Valiante, "Citizen Rights" in Sustainable Development in Canada: Options for Law Reform, (Ottawa: Canadian Bar Association, 1990).

Paul Muldoon, Tim Eder, Mark Van Putten and John Jackson, A Prescription for Healthy Great Lakes (Washington: National Wildlife Federation, 1991).

Paul Muldoon, "Sunset Chemicals: The Dawning of a Less Chemical Canada" Probe Prost, No.14:1, pp. 12-14, Spring, 1991.

Paul Muldoon et al. Planning for Sustainability: Toward Integrating Environment and Land-Use Planning (Toronto: Royal Commission on the Future of Toronto Waterfront, 1991).

CURRICULUM VITAE

Mark S. Winfield
4 Ashstead Pl.
Willowdale, Ontario
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696-8594/491-9306

EDUCATION

1992 Ph.D. Department of Political Science, University of Toronto.
Major Area of Study: Canadian Government and Politics
Minor Area of Study: Public Administration and Policy Development
Thesis Title: The Ultimate Horizontal Issue: Environmental Politics and Policy in Ontario and Alberta, 1971-1992.
Supervisor: Professor J.S. Dupre
Committee: Professor C.J. Tuohy
Professor G. White

1987 Master of Arts (Political Science)
University of Toronto

1986 Bachelor of Arts (4-Year) (Science and Technology Studies)
Institute for the History and Philosophy of Science and Technology, Victoria College, University of Toronto

ACADEMIC AWARDS

University of Toronto Open Scholarship 1989-90, 1990-91

PRESENT POSITIONS HELD

Director of Research, Canadian Institute for Environmental Law and Policy. Responsible for the development and management of the Institute's research program on environmental law and policy. Current areas of research include the economic impact of of environmental regulation, environmental liability, the environmental regulation of biotechnology applications in Canada, and municipal solid and industrial hazardous waste management policy issues. Other responsibilities include the preparation of commentaries on proposed environmental policy measures and representation of the Institute in policy development consultation processes with the Ontario Ministry of the Environment, Environment Canada, and the Canadian Council of Ministers of the Environment.

Instructor, Environmental Studies Program, Innis College, University of Toronto. For September 1992-April 1993. Course design, seminar leadership and marking

responsibilities for approximately 45 students in INN 421Y, Environmental Thought (Dr. B. Mitchell, Senior Instructor).

TEACHING EXPERIENCE

September 1991 to April 1992: Instructor, Environmental Studies Program, Innis College, University of Toronto. Duties as above for approximately 50 students in INN 421Y, Environmental Thought (Dr. B. Mitchell, Senior Instructor).

May 1991 to August 1991: Teaching Assistant, Department of Political Science, University of Toronto. Tutorial and marking responsibilities for approximately 50 students in Pol 203Y, Politics and Government of the United States (Prof. R.C. Vipond).

September 1990 to May 1991: Teaching Assistant, Department of Political Science, University of Toronto. Duties as above for approximately 75 students in Pol 100Y, Introduction to Canadian Politics (Profs. R.C. Vipond and S. Bashevkin).

September 1989-May 1990: Teaching Assistant, Department of Political Science, University of Toronto. Duties as above for Pol 100Y (Profs. H.D. Forbes and N. Wiseman).

September 1988-May 1989: Teaching Assistant, Department of Political Science, University of Toronto. Duties as above for Pol 100Y (Profs. R.C. Vipond and H.D. Forbes).

September 1987-May 1988: Teaching Assistant, Department of Political Science, University of Toronto. Duties as above for Pol 100Y (Profs. R.C. Vipond and H.D. Forbes).

OTHER WORK EXPERIENCE

June 1990 to Present: Research Assistant to Prof. M. Chandler, Dean, Faculty of Arts and Science, and Professor of Political Science, University of Toronto. Work in progress includes "Evaluative criteria for environmental impact assessment processes."

January 1990-March 1990: Research Assistant to Profs. M. Chandler and C.J Tuohy, Department of Political Science, University of Toronto. Focus of research was the economic rationale for the Ontario Waste Management Corporation.

June 1989-September 1989: Research Assistant, Conservation Council of Ontario. Provided research support to the Waste Management and Agriculture Task Forces of the Council, assisted in organizing the Lieutenant-Governor's Conservation Award Dinner. Prepared the discussion paper Municipal Sold Waste Management Issues in the Greater Toronto Area for the Conservation Council of Ontario and the Recycling Council of Ontario.

May 1988-September 1988: Research Assistant, Conservation Council of Ontario. Conducted review of Ontario Hydro Draft Demand/Supply Planning Strategy, assisted in organizing the Lieutenant- Governor's Conservation Award Dinner, provided research

support to waste management, population and energy task forces of the Council, and conducted research for Ontario's Environmental Track Record: A Review of Significant Ontario Government Initiatives (released March 1989).

May 1987-September 1987: Research Assistant, Ontario Manpower Commission, Ministry of Skills Development. Compiled a compendium of post-secondary educational opportunities in human resources management.

PUBLICATIONS

Referred Publications

Winfield, M., and Heidenreich, B., "Sustainable Development, Public Policy and the Law," in Swaigen, J., ed., Environment on Trial: A Handbook of Ontario Environmental Law and Policy, (To be published by Emond-Montgomery Publishers, Toronto, Spring 1993).

Winfield, M., and Swaigen, J., "Water," in Swaigen, J., ed., Environment on Trial: A Handbook on Ontario Environmental Law and Policy, (To be published by Emond-Montgomery Publishers, Toronto, Spring, 1993).

Winfield, M., The Ultimate Horizontal Issue: Environmental Politics and Policy in Ontario and Alberta, 1971-1992, (Ph.D. Thesis, Department of Political Science, University of Toronto, 1992).

Reports

Winfield, M., ed., Looking Back and Looking Ahead: Municipal Solid Waste Management Policy in Ontario from the 1983 Blueprint to 25% Diversion in 1992 - Conference Background Paper, (Toronto: Canadian Institute for Environmental Law and Policy, December 1992).

Winfield, M., Policy Options for Municipal Solid Waste Management in the Greater Toronto Area, (Toronto: Conservation Council of Ontario, 1989).

Winfield, M., Educational Opportunities in Human Resource Planning in Ontario, (Toronto: Ontario Ministry of Skills Development, 1987).

Work in Progress

"Evaluative Criteria for Environmental Impact Assessment Processes in Canada," with Prof. M.A. Chandler. To be completed Spring 1993.

"Linking Environmental Protection and Economic Renewal: An Overview and Evaluation of Environmental Technology Development Programs in Canada," Canadian Institute for Environmental Law and Policy. To be completed February 1993.

"Environmental, Economic and Ethical Issues in the Environmental Regulation of Biotechnology in Canada," (Working Paper 1 of the Canadian Biotechnology Project) Canadian Institute for Environmental Law and Policy. To be completed March 1993.

"Patterns of Environmental Politics: A Comparative Analysis of the Ontario and Alberta Experience," paper to be given at the annual meeting of the Canadian Political Science Association in Ottawa, June 1993.

Conferences

Panelist on "The Canadian Experience," at the First North American Conference on Environmental Law and Policy, Mexico City, November, 1992). Sponsored by the Canadian Institute for Environmental Law and Policy, the Environmental Law Institute (Washington D.C) and the Fundacion Mexicana para la Educacion Ambiental.

AFFILIATIONS

Individual Member and Executive Committee Member, Conservation Council of Ontario.
Member, Innis College Environmental Program Committee.
Member, Canadian Political Science Association.
Member, Federation of Ontario Naturalists.
Member, Royal Canadian Geographic Society.

OTHER SKILLS

Reading Knowledge of French.
Working Knowledge of Wordperfect and LOTUS 1-2-3.

REFERENCES

Available upon request.

CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW AND POLICY

Board of Directors 1992/3

Mr. Brian Armstrong
Smith, Lyons, Torrance, Stevenson & Mayer
Suite 6200, Scotia Plaza
40 King Street West,
Toronto, Ontario
M5H 3Z7
Phone: 369-7297
Fax: 369-7250

Date elected to Board: Oct.19,1989

Mr. Ian Blue
Cassels, Brock & Blackwell
Suite 2100, Scotia Plaza
40 King Street West
Toronto, Ontario
M5N 1B5
Phone: 869-5352
Fax: 360-8877

Date elected to Board: May 18,1989

Mr. J. Doug Cook
P O Box 351
BRIDGENORTH
Ontario K0L 1H0
Phone: (705) 292-6166
Fax: (705) 292-8771

Date elected to Board: Feb 6 1987

Mr. David Hilton (Secretary-Treasurer)
Senior Vice-President
Bank of Nova Scotia
44 King Street West,
Toronto, Ontario
M5H 1H1
Phone: 866-7056
Fax: 866-5903

Date elected to Board: October 19,1989

Mr. David Hunter
Aird & Berlis
Suite 1500
145 King Street West
Toronto, Ontario
M5H 2J3
Phone: 364-1241
Fax: 364-4916

Date elected to Board: October 22,1987

Mr. Rick Lindgren
Counsel
Canadian Environmental Law Association
Suite 401
517 College Street
Toronto, Ontario
M6G 4A2
Phone: 960-2284
Fax: 960-9392

Date elected to Board: January 24,1991

Ms. Marjory Loveys (President)
236 First Avenue,
Ottawa, Ontario
K1S 2G6

Phone:(B) 613-235-7976
Fax: 613-235-2190

Date elected to Board: October 10, 1985

Prof. J.G.W Manzig
Faculty of Law, Rm. 2107
University of Windsor
401 Sunset Ave.,
Windsor, Ontario
N9B 3P4

Phone: 519-253-4232 Ex.2944
Fax: 519-973-7064

Date elected to the Board: February 6,1987

Mr. Al Potter
Managing Editor
McClelland and Stewart
481 University Ave.,
Toronto, Ontario
M5G 2E9

Phone: 598-1114
Fax: 598-7764

Date elected to the Board: September 29,1983

Mr. David Powell
44 Sussex Avenue,
Toronto, Ontario
M5S 1J7

Phone: 971-5141

Date elected to the Board: October 18,1984

Dr Marie Sanderson
Director
The Water Network
Faculty of Environmental Studies
University of Waterloo
Waterloo
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Telephone: (519) 885-1211 ext 6962
Fax: (519) 746-2031

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FINANCIAL STATEMENTS

CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW AND POLICY

June 30, 1991

ERNST & YOUNG

AUDITORS' REPORT

To the Directors of
Canadian Institute for Environmental Law and Policy

We have audited the statement of financial position of **Canadian Institute for Environmental Law and Policy** as at June 30, 1991 and the statements of revenue and expenditures and changes in financial position for the year then ended. These financial statements are the responsibility of the Institute's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Institute as at June 30, 1991 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles.

Ernst + Young

Toronto, Canada,
September 19, 1991.

Chartered Accountants

Canadian Institute for Environmental Law and Policy

Incorporated without share capital under the laws of Ontario

STATEMENT OF FINANCIAL POSITION

As at June 30

	1991 $	1990 $
ASSETS		
Cash and short-term deposits	**205,231**	146,032
Accounts receivable	**42,149**	61,565
Prepaid expenses	**6,480**	2,944
Office equipment, at cost, less accumulated depreciation of $7,104 [1990 - $4,082]	**8,004**	11,026
Library, at cost, less accumulated depreciation of $2,968 [1990 - $2,226]	**742**	1,484
	262,606	223,051
LIABILITIES		
Accounts payable and accrued charges	**13,177**	15,749
Deferred revenue *[note 3]*	**174,264**	171,878
	187,441	187,627
Surplus	**75,165**	35,424

See accompanying notes

Canadian Institute for Environmental Law and Policy

STATEMENT OF REVENUE AND EXPENDITURES

Year ended June 30

	1991 $	1990 $
REVENUE		
Foundation and government project grants *[note 3]*	**301,816**	323,578
Publications	**24,416**	16,057
Sundry	**19,433**	16,479
Corporate and individual donations	**11,125**	33,412
Environmental Youth grant	**9,120**	22,493
	365,910	412,019
EXPENDITURES		
Administrative		
Salaries and benefits	**36,196**	35,399
Rent [including hydro and nonrefundable GST *[note 6]*]	**21,582**	12,677
Environmental Youth program	**9,520**	22,493
General	**8,976**	3,773
Professional fees	**7,750**	7,626
Printing	**6,410**	11,668
Office	**4,092**	4,187
Depreciation	**3,764**	2,925
Telephone	**3,403**	5,512
Transport and delivery	**952**	119
Postage	**902**	2,752
Insurance	**800**	670
Bad debts	**131**	585
	104,478	110,386
Less administration expenditures recovered	**80,125**	77,880
Net administrative expenditures	**24,353**	32,506
Research projects *[note 3]*	**301,816**	323,578
	326,169	356,084
Excess of revenue over expenditures for the year	**39,741**	55,935
Surplus (deficit), beginning of year	**35,424**	(20,511)
Surplus, end of year	**75,165**	35,424

See accompanying notes

Canadian Institute for Environmental Law and Policy

STATEMENT OF CHANGES IN FINANCIAL POSITION

Year ended June 30

	1991 $	1990 $
OPERATING ACTIVITIES		
Excess of revenue over expenditures for the year	**39,741**	55,935
Non-cash item included in earnings		
Depreciation	**3,764**	2,925
Increase in deferred revenue	**2,386**	63,330
Net change in non-cash working capital balances related to operations *[note 5]*	**13,308**	(7,332)
Cash provided by operating activities	**59,199**	114,858
INVESTING ACTIVITIES		
Additions to office equipment	**—**	(5,611)
Cash used in investing activities	**—**	(5,611)
Net increase in cash during the year	**59,199**	109,247
Cash and short-term deposits, beginning of year	**146,032**	36,785
Cash and short-term deposits, end of year	**205,231**	146,032

See accompanying notes

Canadian Institute for Environmental Law and Policy

NOTES TO FINANCIAL STATEMENTS

June 30, 1991

1. MISSION

Founded in 1970, the Canadian Institute for Environmental Law and Policy ["CIELAP"] is an independent, not for profit research and educational organization.

CIELAP's principal goals are to work to improve legal and economic policy affecting the environment, in a manner that will assist government, industry, public interest groups and individuals in their daily decision making and further the protection of human health and the preservation of the natural environment. This involves:

- an analysis of current environmental policy issues;
- identification of emerging environmental issues facing Canada and the world;
- undertaking research into, and the evaluation of, legal and economic policy options for public and private sector responses;
- a communication of the conclusions of the research results to lay and professional audiences in a clear non-partisan way.

CIELAP is unique among environmental groups. Our approach and philosophy has always been in-depth research combined with consultation. We believe that for change to occur, all parties who will be affected by and who can influence these changes must be involved. CIELAP promotes dialogue among governments, the private sector and non-government groups. These players are encouraged to reach consensus.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The financial statements of CIELAP have been prepared in accordance with generally accepted accounting principles. The significant accounting policies are summarized below:

Grants, donations and deferred revenue

Grants and donations are recorded as revenue in the statement of revenue and expenditures on an accrual basis, except for those grants and donations received for specific purposes which are accounted for as deferred revenue until spent. Special purpose grants receivable are recorded as revenue as the related expenditures are incurred.

When it is anticipated that the expenditures incurred will exceed the revenue generated from a specific project, the loss on the project is recognized in the year that it is identified.

Fixed assets

Office equipment and library books are recorded at cost. Depreciation is calculated using the straight-line method over an estimated useful life of five years.

3. DEFERRED REVENUE

CIELAP has received donations and grants for specific purposes of which $174,264 remained unspent as at June 30, 1991. At June 30, 1990, deferred revenue amounted to $171,878. Expenditures on research projects are charged to expenditures as incurred with an equivalent amount of revenue being shown under foundation and government project grants. Any balance of deferred revenue is recognized in the year the project is completed. At June 30, 1991, this balance represents funds not yet spent on the following projects:

	Deferred revenue June 30, 1990 $	Funds received $	Expenses incurred $	Deferred revenue June 30, 1991 $
Canadian Environmental Law Reports	—	—	20	(20)
Sustainable Development and Energy	26,735	40,885	58,850	8,770
Key to Compliance Handbook	9,694	—	—	9,694
Leaking Underground Storage Tanks	—	—	1,358	(1,358)
Program for Zero Discharge	79,291	171,134	159,872	90,553
Environment on Trial	36,915	57,500	35,404	59,011
Canadian Environmental Law Report Index [1983 - 1986]	5,120	—	3,520	1,600
Surface Water Quality	—	4,578	4,578	—
Due Diligence	6,012	5,400	5,024	6,388
International Environmental Journal	(150)	—	—	(150)
Environmental Scan Report	—	9,065	9,065	—
World Cities Conference	—	2,240	2,464	(224)
Metroworld 1991	—	6,100	6,100	—
Centre for Pollution Prevention	—	2,500	2,500	—
Integrating the Environment into the Planning Process	2,481	—	2,481	—
Lakewide Management Contract	5,780	—	5,780	—
Participatory Funding	—	4,800	4,800	—
	171,878	304,202	301,816	174,264

All of the above projects are expected to be completed by June 30, 1992, except the following:

Sustainable Development and Energy
Environment on Trial
Due Diligence
Canadian Environmental Law Reports
Leaking Underground Storage Tanks

4. LEASE COMMITMENTS

On February 1, 1990 CIELAP moved to new office premises of 1,200 square feet. It previously had occupied an office space of 600 square feet.

The present lease expires January 31, 1995. The future minimum annual rental payments, net of applicable GST, required under the lease are as follows:

	$
1992	21,400
1993	23,650
1994	25,210
1995	15,008

5. NET CHANGE IN NON-CASH WORKING CAPITAL BALANCES RELATED TO OPERATIONS

The net change in non-cash working capital balances related to operations included in the statement of changes in financial position consists of the following:

	1991 $	1990 $
Increase (decrease) in accounts payable and accrued charges	(2,572)	807
Increase in prepaid expenses	(3,536)	(2,444)
Decrease (increase) in accounts receivable	19,416	(5,695)
	13,308	(7,332)

6. TAX STATUS

Income taxes

CIELAP is registered as a charitable organization under the Income Tax Act (Canada) [the "Act"] and, as such, is exempt from income taxes and able to issue donation receipts for income tax purposes. In order to maintain its status as a charitable organization registered under the Act, CIELAP must meet certain requirements within the Act. In the opinion of management, these requirements have been met.

Goods and Services Tax

As a registered charity, CIELAP does not collect GST and is eligible to apply for a 50% refund of GST amounts paid.

CIELAP 92·93

Publications List

CANADIAN INSTITUTE FOR ENVIRONMENTAL LAW & POLI[CY]
517 College Street, Suite 400, Toronto, Ontari[o]
(416) 923-3529 FAX (416) 923-5949

☐ **TORONTO AREA WATERS**

$85.00

These proceedings from a symposium held May 21 1987 include two major background papers: "Aquatic Ecosystems of the Toronto Area" (Regier) and "Toronto Waters: The Regulatory Context" (Skof & Pickfield). Also included are comments and discussion on future action and objectives for Toronto area waters, from agencies such as the Toronto Harbour Commission, the City of Toronto Planning Department, the Metro Toronto and Region Conservation Authority, and the Ontario Ministries of Environment and Natural Resources. 200 pages.

☐ **CROSS BORDER LITIGATION: ENVIRONMENTAL RIGHTS IN THE GREAT LAKES ECOSYSTEM**

by P R Muldoon (The Carswell Company 1986) $80.00

An in-depth survey of the environmental rights before the courts and tribunals of the 12 jurisdictions in the Great Lakes Basin. The book identifies the barriers to participation in the legal proceedings of other jurisdictions, and recommends various reforms to overcome these barriers. 410 pages. (Available from Carswell).

☐ **ENVIRONMENTAL ASSESSMENT IN ONTARIO**

by R Gibson and B Savan (1986) $30.00

The first comprehensive examination of the Ontario Environmental Assessment Act and its implementation since introduction of the Act in 1976. The book is a comprehensive analysis of how well the current environmental assessment process in Ontario has met the tests of effectiveness, efficiency and fairness, and how the process may now be improved through administrative, regulatory and legislative reforms. 411 pages.

☐ **THE REGULATION OF TOXIC AND OXIDANT AIR POLLUTION IN NORTH AMERICA**

CIELAP with the Environmental Law Institute of Washington, D C Garrod, Vallante, Melon and Ritts. Available from CCH Canadian, 1986.

This book provides a comprehensive examination of this new regulatory challenge for Canada and the United States. It documents the sources, the transport and the effects of toxic air pollutants and photochemical oxidants. Also included are assessments of current law and policy goals for regulatory reform in both nations. 257 pages.

☐ **BREAKING THE BARRIERS: A STUDY OF LEGISLATIVE AND ECONOMIC BARRIERS TO INDUSTRIAL WASTE REDUCTION AND RECYCLING.**

A joint project of CIELAP and Pollution Probe Foundation. Virginia Adamson, 1984. $15.00

An increase in number of companies have adopted preventative approaches to waste management by implementing at source, reduction and recycling technology in their industrial processes. This particular study examines the barriers that have prevented more companies from making the same changes, and makes recommendations to federal and provincial governments and industry. 100 pages.

☐ **ENVIRONMENTAL MEDIATION: FROM THEORY TO PRACTICE (4 VOLUMES) BY S SHRYBMAN, 1984**

- *Vol 1* *From Theory to Practice (113 pages)* $25.00
- *Vol 2* *Five Case Studies (111 pages)* $25.00
- *Vol 3* *Three Case Assessments (87 pages)* $25.00
- *Vol 4* *Bibliographies (41 pages)* $25.00

☐ **THE REGULATION OF BIOTECHNOLOGY: CONFERENCE PROCEEDINGS, 1984**

$85.00

This book is a compilation of the papers presented at an October 9 1984 CIELAP conference. There is an impressive collection of speakers, representing international, government, and business interests in this new field of science. 190 pages.

☐ **CONTROL ORDERS AND INDUSTRIAL POLLUTION ABATEMENT IN ONTARIO BY R GIBSON, 1983**

$15.00

An examination of the use of control orders by the Ontario Ministry of the Environment, including case studies and recommendations for improvement to the process. 170 pages.

☐ **HAZARDOUS WASTE MANAGEMENT IN CANADA: THE LEGAL AND REGULATORY RESPONSE**

by J F Castrilli, 1982. 182 pages. $40.00

☐ **BENEFITS AND BURDENS: THE ECONOMIC IMPACT OF ENVIRONMENTAL REGULATIONS**

by the Canadian Institute for Environmental Law and Policy, 1981 $60.00

☐ **ENVIRONMENTAL RIGHTS IN CANADA**

by John Swaigen, Editor, 1981, published by Butterworths.

Ten respected authors discuss the role of courts, policy-makers and the general public in developing and enforcing environmental laws. A number of the topics have never before been comprehensively surveyed in the context of Canadian environmental law. Available from Butterworths.

☐ **HOW TO FIGHT FOR WHAT'S RIGHT: THE CITIZEN'S GUIDE TO PUBLIC INTEREST LAW**

by John Swaigen, 1981 $10.00

This book is a guide both for lawyers and for lay people to steer them through the legal thickets they face when they take on government and business in the courts. It is a guide that shows citizen groups how to use the legal system to their advantage. 150 pages.

Canadian Environmental Law Reports (CELR)

These reports cover the proceedings of court cases involving environmental affairs, from impact assessment of uranium mining to the breach of sewer use by-laws. Published by CIELAP from 1972 - 1986 and jointly published after 1986 with the Carswell Company. CELR are published 12 times a year. A subscription is available from the Carswell Company, 2075 Kennedy Road, Scarborough, Ont M1T 3V4.

☐ **CELR CUMULATIVE INDEX 1972-1983**

The index provides references, by statute and by subject to all cases reported in the Canadian Environmental Law Reports between 1972 and 1983.

$35.00

☐ **CELR CUMULATIVE INDEX 1983-1985**

The index provides references, by statute and by subject, to all cases reported in the Canadian Environmental Law Reports between June 1983 (Volume 12 No 3) to December 1985 (Volume 14 No 5/6)

$35.00

CIELAP PUBLICATION ORDER FORM

I would like to order the vollowing CIELAP publications:

TITLE	AUTHOR	PRICE
	10% SHIPPING AND HANDLING	
	TOTAL	

☐ Cheque/Money Order enclosed

Name:

Address:

Please mail it:
CIELAP
517 College Street, Suit 400,
Toronto, Ontario
M6G 4A2

New Publications

REGULATORY OFFENCES IN CANADA
by John Swaigen, 1992
Published Jointly with Carswell Publication 68.00

This is the first comprehensive text that treats regulatory offences as a separate body of law. It analyzes the similarities and differences between true crimes and regulatory offences, and discusses the bases of liability, reviews the development of "strict liability" offences, and provides an evaluation of methods to classify regulatory offences used by the Courts and identified as strict liability, mens rea, or absolute liability, and the available defences. The book describes the liability of corporations, their shareholders, directors, officers, supervisors, employees and agents, and the liability of landlords for acts of tenants, and liability of purchasers, lenders, insolvency practitioners and government officials. It also discusses the impact of the Canadian Charter of Rights and Freedoms on regulatory offences.

ENVIRONMENT ON TRIAL
by John Swaigen
(Expected Date of Publication: Spring 1993)

A new and current text of a former important handbook on environm ental laws. Its format has been expanded and now comprises 27 chapters, including new topics such as: Preserving Ontario's Wilderness Legacy, Wetlands Preservation, Wildlife, Conserving and Upgrading the Built Environment, Conservation Covenants, Easements and Gifts and Energy Management. This text is written to provide the ordinary person with an understanding of laws and policies to protect the environment, and to inspire action for stronger legislation and policies where environmental protection is incomplete. It is referred to by professionals with limited environmental law experience, including planners, engineers and biologists as it provides an understanding of the legal system protecting Ontario's environment, details evidence and hearing procedures, environmental litigation and legal strategies.

A BRIEF WITH RESPECT TO BILL 118
By Jack Gibbons, 1992 $5.00

This brief to the Resources Development Committee of the Ontario Legislature explains why it is in the public interest for Ontario Hydro to encourage its customers to switch from electricity to oil, natural gas and solar energy. 14 pages

INTEGRATED RESOURCE PLANNING PRINCIPLES FOR ONTARIO'S NATURAL GAS UTILITIES
By Jack Gibbons, 1992 $10.00

This expert testimony prepared on behalf of Pollution Probe explains how Ontario's gas utilities should evaluate gas supply, energy conservation and fuel switching options and programs. The testimony also outlines the regulatory reforms necessary to make the implementation of cost-effective energy conservation programs the most profitable course of action for Ontario's gas utilities. 53 pages

KEY TO COMPLIANCE
by John Tidball and Bruce McMeekin
Expected Date of Publication: November 1992.

A handbook for small/medium size companies that provides a convenient reference guide to environmental legislation in Ontario as well as a step by step guide to establishing an in-house environmental management system.

Current Publications:

A PRESCRIPTION FOR HEALTHY GREAT LAKES. A REPORT OF THE PROGRAM FOR ZERO DISCHARGE
by the Canadian Institute For Environmental Law and Policy and the National Wildlife Federation (1991) $10.00

A Strategy for the regulatory, policy and program reform to implement Zero Discharge and the other goals of the Great Lakes Water Quality Agreement. 62 pages

DEVELOPING OPTIONS FOR TECHNOLOGY-BASED STANDARDS FOR THE PETROLEUM REFINING SECTOR IN THE GREAT LAKES
by Susan Sang (1991) $30.00

This report reviews the water quality standards in Ontario prior to MISA, examines available effluent treatment technologies and proposes a series of Best Available Technology (BAT) options to deal with petroleum refinery wastewater. 60 pages

DEVELOPING OPTIONS FOR TECHNOLOGY-BASED STANDARDS FOR THE PULP AND PAPER SECTOR IN THE GREAT LAKES
by Susan Sang (1991) $30.00

This report reviews the water quality standards in Ontario prior to MISA, examines available effluent treatment technologies and proposes a series of Best Available Technology (BAT) options to deal with pulp and paper wastewater. 60 pages

POLLUTION PREVENTION IN THE GREAT LAKES: A SURVEY OF CURRENT EFFORTS AND AN AGENDA FOR REFORM
by Marcia Valiante and Paul Muldoon (1991) $40.00

A review of current government efforts on pollution prevention in the Great Lakes and an agenda for reform of existing programs. 140 pages.

DO YOU HAVE A ZERO DISCHARGE HOME?
by CIELAP (1990) $1.00

STILL GOING TO B.A.T. FOR WATER QUALITY? A FOUR YEAR REVIEW OF THE ONTARIO MUNICIPAL-INDUSTRIAL STRATEGY FOR ABATEMENT
by Paul Muldoon and Burkhard Mausberg (1990) $10.00

SUSTAINABLE DEVELOPMENT; ITS IMPLICATIONS FOR THE CANADIAN NATURAL GAS INDUSTRY
by Jack Gibbons (1990) $10.00

A speech given at the "Canadian Gas Exchange '90 Conference", Toronto, November 15, 1990. 20 pages

TURNING OFF THE TAP: WATER CONSERVATION LAW IN ONTARIO WITH EMPHASIS ON THE MUNICIPAL LEVEL
by Paul Muldoon and Carole Saint-Laurent (1990) $20.00

An examination of current water conservation law on Ontario. Provides a review of the problems or opportunities for municipalities to undertake water conservation measures along with reasons for reform. 66 pages.

Publications since 1980:

FOREST AND ASSESSMENT: DEVELOPMENT OF THE CLASS ENVIRONMENTAL ASSESSMENT FOR TIMBER MANAGEMENT IN ONTARIO
by J. Dunster, R.B. Gibson, H. Cook (1989) $25.00

Includes the application on environmental assessment requirements to forest management in Ontario, major development in forest planning and management between 1976-1988, problems with the current approach, options and directions for a new era. 150 pages

FROM POLLUTION PREVENTION TO WASTE REDUCTION: A COMPREHENSIVE HAZARDOUS WASTE STRATEGY FOR ONTARIO
by D. McDonald and P. Pickfield (1989) $15.00

A review of Ontario government initiatives since 1978 and recommendations for long term solutions. 75 pages

GREENPRINT FOR CANADA: A FEDERAL AGENDA FOR THE ENVIRONMENT
(1989) $5.00

A Federal action plan for the 1990's prepared by a coalition of environment groups. 31 pages

A REGULATORY AGENDA FOR SOLID WASTE REDUCTION
by S. Shrybman (1989) $20.00

A report prepared for SWEAP of Metro Toronto describing the use of regulation to reduce municipal solid waste. 123 pages

SUSTAINABLE DEVELOPMENT: ITS IMPLICATIONS FOR ENERGY POLICY IN CANADA
by J.Gibbons and M. Valiante (1989) $10.00

This publication undertakes an analysis and comparison of competing concepts of sustainable development for Canadian Energy Policy. 36 pages

SUSTAINABLE DEVELOPMENT: ITS IMPLICATIONS FOR THE POWER CORPORATION ACT
by Jack Gibbons (1989) $10.00

This brief to the Select Committee on Energy of the Ontario Legislature analyses how the Power Corporation Act (the Act which governs Ontario Hydro) can be brought into conformity with the principles of sustainable development as enunciated by the Bruntland Commission. 27 pages

BRIDGING THE GAP: A HANDBOOK FOR SCIENTISTS AND JOURNALISTS ON TOXIC POLLUTION
(1989) $5.00

A handbook to develop better communications between scientists and reporters working in the field of toxic pollution, containing an overview of the subjects of toxic contamination, suggestions for methods of better communication between scientists and journalists, and a reference section. 25 pages

THE COMPANY POLLUTED - SO WHY DID I GET CHARGED? $85.00

A collection of papers presented at the January 21, 1988 CIELAP conference on the individual liability of directors, officers and employees for corporate pollution offenses. Topics include individual vs. corporate liability under federal, provincial, and municipal law. 140 pages

CONTROL AT THE SOURCE: REGULATING INDUSTRIAL SEWER-USE IN ONTARIO
by Pickfield, Pushchak, Thompson, Bernard and Khavari (1988) $30.00

This major study reviews the nature of the environmental threat, analyzes existing regulation to identify aspects requiring reform, and then presents an integrated plan of action, setting forth specific and practicable recommendations for regulatory reform. 172 pages

TOXIC REAL ESTATE MANUAL
by Glenn, Shier, Sisson and Willms
(Corpus Information Services, 1988) $147.00

This book provides an extensive review of all aspects of the ownership of polluted property, including courses of action available to neighbors or tenants of contaminated land. The manual also covers environmental audits, American and Canadian trends, and the responsibilities of real estate agents, owners and purchasers. Tougher environmental regulations can impose devastating responsibilities and liabilities on the unwitting purchaser of a toxic property. 100 pages

ZERO DISCHARGE: A STRATEGY FOR THE REGULATION OF TOXIC SUBSTANCES IN THE GREAT LAKES ECOSYSTEM
by Paul Muldoon and M. Valiante (1988) $30.00

Historically, pollution control has been characterized by the regulation of dilution levels, which does nothing to limit the total discharge of toxins. This report sets forth recommendations for a number of specific and positive steps which should be taken to implement the philosophy of zero discharge. 80 pages.

BIOTECHNOLOGY POLICY DEVELOPMENT (1987)
This is a report developed by CIELAP for the Ontario Ministry of the Environment to aid in the establishment of regulatory policy governing environmental release of experimental and commercial biotechnology products. $20.00

Volume I is the actual report to the MOE, including recommendations concerning the potential environmental effects of biotechnology, the policy issues which must be addressed, and suggestions on initial steps to be taken by the Ministry. 125 pages. $30.00.

Volume II contains two major papers on biotechnology presented at CIELAP biotechnology seminars in 1986: "Environmental Implications of Biotechnology" by Glick and Skof, and "Policy Issues Raised by the Application of Biotechnology" by Courage and Skof. 270 pages.

ONTARIO HAZARDOUS WASTE MANAGEMENT FORUM
(August 30 - September 1 1987, Nottawasaga Inn) $65.00

A joint project of CIELAP and the Waste Management Branch of the Ontario Ministry of the Environment. Background papers and proceedings are included in this package. Discussed are standards, compliances, securities, contingency funds, transboundary issues, and the four R's of waste management - reduction, reuse, recovery and recycling.

ONTARIO HAZARDOUS WASTE POLICY: A PROVINCIAL FORUM
(November 30 - December 2 1986, Bolton, Ontario)
by P Pickfield $65.00

The publication includes a discussion paper that examines all aspects of Ontario hazardous waste law and policy, and the proceedings of a forum discussion attended by leaders from all sectors. These proceedings provide an excellent snapshot view of current things on directions for hazardus waste regulation.115 pages.

POLLUTION AND THE LAW, 1987 $85.00

Proceedings of the February 26 1987 CIELAP conference on recent and pending changes to environmental law, and the effect that these new regulations will have on industry. Topics include the Spills Bill, the Environmental Compensation Corporation, increased fines in Bill 112, MISA, changes to air pollution regulation 308 and the new Federal Environmental Protection Act. 230 pages.

PROTECTING THE GREAT LAKES: A CITIZEN'S GUIDE TO CROSS BORDER LITIGATION, 1987 $5.00

A Handbook for citizens who want to use litigation as a weapon in the fight against Great Lakes pollution on both sides of the border. 15 pages.

The financial statements for Pollution Probe are currently being audited. We have included unaudited statements for fiscal year 1991-1992, and will submit the Auditor's report as soon as it becomes available (at the beginning of December 1992).

23 Years Protecting the Environment

POLLUTION PROBE

La protection de l'environnement depuis 23 ans

THE POLLUTION PROBE FOUNDATION BOARD OF DIRECTORS

August 1992

POLLUTION PROBE FOUNDATION
BALANCE SHEET
as at 30 September, 1992

UNAUDITED

ASSETS

	1992	1991
Current Assets		
Operating Cash (Bank Indebtedness)	(63,320)	(83,872)
Project Cash	150,773	44,937
Accounts Receivable	25,423	30,319
Contract Receivables (Net)	63	26,973
Prepaid Expense	18,558	37,405
Inventories	2,602	2,177
Total Current Assets	134,099	57,939
Fixed Assets		
Equipment & Vehicle	80,994	85,994
Building and Land	666,030	660,000
Total Fixed Assets	747,024	745,994
TOTAL	881,123	803,933

LIABILITIES AND SURPLUS

Current Liabilities		
Accounts Payable	45,752	140,833
Accrued Liabilities	21,768	12,186
Loan Payable	10,960	9,875
Total Current Liabilities	78,480	162,894
Long Term and Other Liabilities		
Long Term Loan Payable	175,000	175,000
Deferred Revenue	177,526	34,175
Total Long Term and Other Liabilities	352,526	209,175
Surplus		
Contributed Surplus	538,850	543,850
Operating Surplus (Deficit)	(88,733)	(111,986)
Total Surplus	450,117	431,864
TOTAL	881,123	803,933

POLLUTION PROBE FOUNDATION
STATEMENT OF REVENUE AND EXPENSE
for the year ended 30 September 1992

UNAUDITED

	ACTUAL	BUDGET	+/(-)
REVENUE			
Individual Donations	1,016,801	1,018,255	(1,454)
Corporate Donations	80,461	60,000	20,461
Foundation Donations	32,100	42,000	(9,900)
Government Grants	52,000	50,000	2,000
Government & Other Contracts	262,601	271,990	(9,389)
Sale of Goods & Services	66,231	38,250	27,981
Interest	3,188	600	2,588
TOTAL	1,513,382	1,481,095	32,287
EXPENSE			
Personnel			
Salaries & Wages	811,061	842,095	(31,034)
Short Term Contracts	120,626	88,133	32,493
Statutory Contributions	67,608	70,531	(2,923)
Group & Other Benefits	21,652	24,178	(2,526)
Recruiting	448	600	(152)
	1,021,395	1,025,537	(4,142)
Office & Equipment			
Loan Interest & Property Tax	28,228	18,000	10,228
Office Rent	6,848	6,995	(147)
Insurance, Maintenance & Utilities	12,159	14,239	(2,080)
Equipment Expense	10,139	5,930	4,209
Vehicle Expense	14,917	18,992	(4,075)
Couriers	2,759	4,468	(1,709)
Telephone & Long Distance	25,230	19,922	5,308
Photocopying	21,564	14,704	6,860
Printing	44,178	62,625	(18,447)
Postage & Mailing	60,619	39,787	20,832
Office Expense	9,339	10,259	(920)
	235,980	215,921	20,059
Other Expense			
Travel	14,418	27,191	(12,773)
Room Rentals & Catering	1,881	0	1,881
Memberships	940	1,600	(660)
Promotion	8,213	12,210	(3,997)
DM & Other Management Fees	13,149	12,000	1,149
Telemarketing Charges	159,990	158,392	1,598
Audit & Legal Fees	13,296	8,200	5,096
Interest & Bank Charges	7,482	7,588	(106)
Reference Materials	2,295	1,620	675
Misc and GST Expense	11,075	13,360	(2,285)
	232,739	242,161	(9,422)
TOTAL	1,490,114	1,483,619	6,495
SURPLUS (DEFICIT)	23,268	(2,524)	