

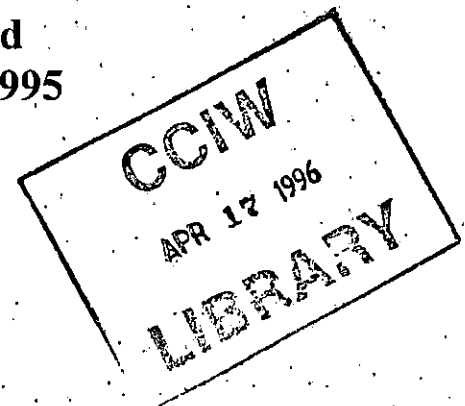


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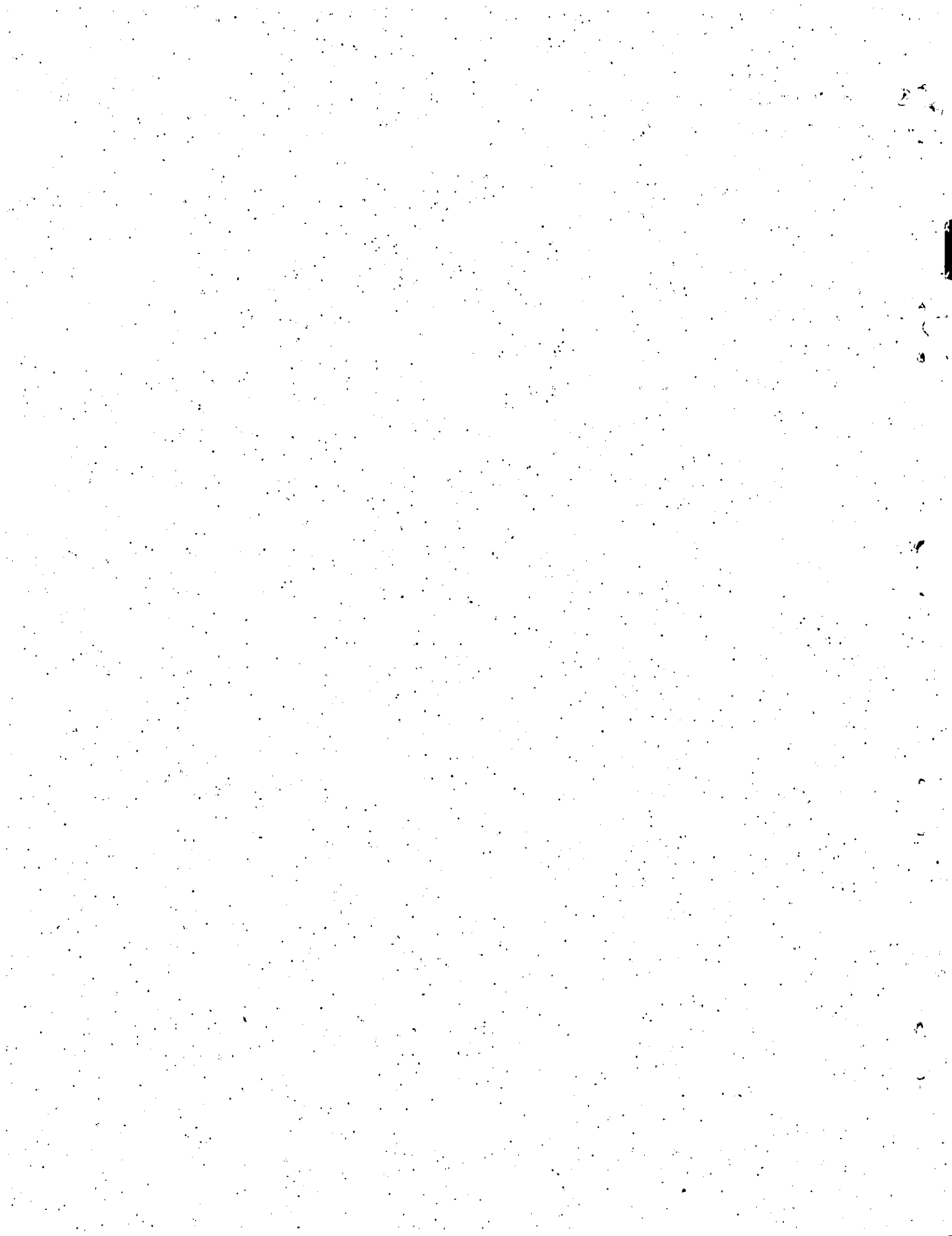
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Canadian Environmental Protection Act

Report for the Period
April 1994 to March 1995



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Canadian Environmental Protection Act

Report for the Period
April 1994 to March 1995



At the end of each fiscal year, Environment Canada publishes an annual report for Parliament on the *Canadian Environmental Protection Act* (CEPA). This report covers the period from April 1, 1994 to March 31, 1995.

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Table of Contents

<i>Minister's Message</i>	<i>1</i>
<i>Canadian Environmental Protection Act</i>	<i>2</i>
Reviewing CEPA	2
The CEPA Office	2
Issues Overview Paper	2
Issue Elaboration Papers	2
CEPA Evaluation	3
The Standing Committee on Environment and Sustainable Development	4
Sharing our Responsibility for the Environment	5
CEPA's Channels for Cooperative Action	5
Advisory Panels	5
Federal-Provincial Advisory Committee	5
The Federal-Provincial Working Group on Air Quality Guidelines and Objectives	5
Agreements with Provinces and Territories	6
 <i>CEPA Part I: Environmental Quality</i>	 <i>8</i>
Research and Monitoring	8
Environmental Technology Centre	8
Wastewater Technology Centre	9
National Water Research Institute	10
Canadian Wildlife Service	11
National Hydrology Research Institute	14
Atmospheric Environment Service	15
State of the Environment	16
Reporting	16
Ecological Monitoring and Assessment	17
Environmental Indicators	17
Ecological Framework	17
Environmental Information Network	18
Non-Regulatory Instruments	18
Environmental Quality Guidelines	18
The Environmental Choice Program	19
 <i>CEPA Part II: Toxic Substances</i>	 <i>20</i>
The Priority Substances List	20
The Priority Substances List II	20
Collecting Information	21
Confidentiality Requests	21
Disclosing Information	21
The Domestic Substances List	22
The Non-domestic Substances List	23

New Substances	23
Confidential Business Information	24
Good Laboratory Practice	24
Creating Regulations	24
Strategic Options Process	25
Regulatory Review	25
Recently Developed Regulations and Amendments	26
Ozone-depleting Substances Regulations	28
Release of Toxic Substances	29
Recovery of Reasonable Costs	29
Export and Import of Hazardous Wastes	30
The Basel Convention	30

CEPA Part III: Nutrients **31**

CEPA Part IV: Controls on Government Organizations **32**

The Federal Code of Environmental Stewardship	32
---	----

CEPA Part V: International Air Pollution **32**

Sulphur Dioxide Protocols	32
No _x and VOC Protocols	33
The Canada-United States Air Quality Agreement	33

CEPA Part VI: Controlling the Disposal of Substances at Sea **34**

Permits for Ocean Dumping	34
Permits Granted in 1994-95	34
Permits Rejected in 1994-95	35
Emergency Disposal Off Newfoundland	36
Regional Forecasts for 1995-96	36
Research to Support Ocean Dumping Regulations	36
International Activities	37
Ocean Dumping Action Plan	37
Amendments to the Ocean Dumping Regulations and CEPA	38

CEPA Part VII: General Information **38**

Notices of Objection and Boards of Review	38
Enforcement and Compliance	39
Stronger Enforcement Mechanisms	39
Office of Enforcement	39
Inspections	39
Investigations	39

Uniform Enforcement Guidelines	40
National Inspection Plan	40
National Training Program	40
Computerized Information System	41
Enforcement Activities	41

Health Canada's Contributions under CEPA **43**

Environmental Quality	43
Regulating Toxic Substances	43
Priority Substances	43
New Substances	44
Managing Toxic Substances	45
Control of Toxic Substances	45
Fuels	45
Other Activities	46
Research Activities	46
Harmonization	46
Communications	46

CEPA Across Canada **47**

Atlantic Region	47
Quebec Region	48
Ontario Region	49
Prairie and Northern Region	49
Pacific and Yukon Region	50

Appendix A: Publications Related to CEPA **53**

Minister's Message

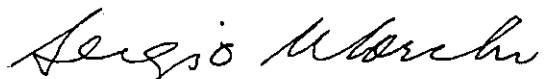
I am pleased to present the 1994-95 annual report on the *Canadian Environmental Protection Act* (CEPA) to Parliament. I would like to acknowledge the contribution of the many individuals at both Environment Canada and Health Canada who are working to ensure that CEPA offers the environmental protection Canadians have a right to expect. A number of achievements were realized during the last year, among them:

- ▶ The establishment of the Priority Substances List II Ministerial Expert Advisory Panel to provide Ministers with a recommended list of substances by the end of September 1995;
- ▶ Publication of the first National Pollutant Release Inventory which included a total of 5,248 substance reports for the year 1993;
- ▶ Amendments to the Ozone-depleting Substances Regulations, the Export and Import of Hazardous Wastes Regulations and the Gasoline Regulations;
- ▶ New Substances Notification Regulations were also introduced; and
- ▶ The launch of the CEPA Review by the Standing Committee on Environment and Sustainable Development.

CEPA is broad legislation based on sound science. Research, technology development and promotion, regulations and enforcement, public education and shared decision-making are key tools to implementing good environmental practices. This government is committed towards building a Canada based on the principles of sustainable development and CEPA can contribute to that goal.

The CEPA Review will determine how best to improve the administration and effectiveness of this major piece of legislation. The Review is timely given that much has changed in the field of environmental protection since CEPA became law in 1988. Likewise, experience with the Act provides ample opportunity to revisit that law, examine why it succeeded in some areas and was less effective in others. The aim of the review is to keep what was best in the Act and to strengthen the preventative capabilities of CEPA.

The year ahead will be important as we go forward in responding to the Standing Committee's recommendations. I intend to see to it that CEPA is revitalized to fully meet the challenges of the coming century.



Hon. Sergio Marchi
Minister of the Environment

Canadian Environmental Protection Act

The *Canadian Environmental Protection Act* (CEPA) is "an Act respecting the protection of the environment and human life and health." When CEPA was created in 1988, the government brought together, in a comprehensive piece of legislation, environmental provisions of several other statutes administered by Environment Canada (EC). Those provisions include those dealing with toxic substances, nutrients, ocean dumping, environmental research, guidelines and codes of practice as well as agreements with provinces and territories. Other Acts which, with CEPA, protect the Canadian environment include those preserving our heritage, parks, wildlife, aquatic life, natural resources and threatened regions.

CEPA's comprehensive mandate covers toxic substances throughout the ecosystem and may control any stage of a product's life cycle from development and manufacture to transportation and disposal. Its primary focus is prevention - averting environmental problems before they occur. Preventive measures include strong regulations and enforcement mechanisms; non-regulatory approaches, such as environmental guidelines, codes of practice and incentives with industry; as well as the development and transfer of pollution measurement and control technologies.

Through CEPA, the federal government recognizes and encourages the shared stewardship of the environment with business, consumers and other levels of government, both nationally and internationally. Environment Canada and Health Canada develop CEPA regulations and guidelines, and Environment Canada administers the Act on behalf of the federal government.

Reviewing CEPA

Section 139 of CEPA calls for a Parliamentary Review of the Act within five years of the enactment of the legislation. In June 1993, a motion to refer CEPA to committee for review was brought before the House of Commons. In light of the upcoming federal election, the Standing Committee on Environment deferred the Review until after the election. The final motion referring CEPA to the Standing Committee on Environment and Sustainable Development was adopted by the House of Commons on June 10, 1994.

The CEPA Office

Environment Canada established the CEPA Office to co-ordinate the many activities necessary for a thorough review of the Act. The CEPA Office is to:

- ▶ Assist the Standing Committee on Environment and Sustainable Development to conduct its review of CEPA for the Parliament of Canada;
- ▶ Maintain close liaison and ongoing communications with other government departments; and
- ▶ Ensure that interested Canadians and clients are kept fully informed of developments under the Parliamentary Review.

Issues Overview Paper

In anticipation of the Committee's needs, Environment Canada and Health Canada prepared an Issues Overview Paper outlining those issues which the Committee might wish to investigate during its review of CEPA. The Issues Overview does not make recommendations - it is what it purports to be - an outline of those issues which are now topical in the environmental protection field. The Issues Overview in no way limits the authority or the independence of the Committee to determine the scope of the Review.

The Issues Overview Paper was tabled in the House of Commons on June 10, 1995.

Issue Elaboration Papers

Detailed issue elaboration papers exploring a number of issues which the Committee might wish to investigate in detail were also prepared. The topics are:

- ▶ Sustainable Development in Canada
- ▶ Biodiversity

-
- ▶ Ecosystem Approach
 - ▶ Coastal Zone Management in Canada
 - ▶ Federal House in Order
 - ▶ Environmental Protection on Indian Lands
 - ▶ Pollution Prevention
 - ▶ Economic Instruments
 - ▶ Community Right to Know
 - ▶ Public Participation for Environmental Protection
 - ▶ Environmental Emergencies
 - ▶ Negotiated Settlements: An Enforcement Option
 - ▶ Administrative Monetary Penalties - Their Potential Use in CEPA
 - ▶ Inspectors' Powers and Provisions Governing Official Analysts in CEPA
 - ▶ Guidance Document on the Options Evaluation Process
 - ▶ Federal Intergovernmental Co-operation on Environmental Management: A Comparison of Developments in Australia and Canada
 - ▶ Precautionary Principle
 - ▶ The Globalization of Environmental Protection and National Accountability

These issues elaboration papers are neutral and are meant to serve as reference materials for the Committee's use.

CEPA Evaluation

In order to assist the Standing Committee in its review of CEPA, Environment Canada and Health Canada commissioned, in 1993, an independent evaluation of CEPA. The evaluation contains 58 recommendations on improving the administration and effectiveness of CEPA. The recommendations fall into two categories: those which are administrative and can be acted on at the bureaucratic level and those which would require amendments to CEPA. The Report concluded that CEPA's implementation had been hampered by:

- ▶ the fact that CEPA does not cover all toxic issues under federal jurisdiction, but exists within a patchwork of regulations and enforcement schemes;
- ▶ the failure of the Act to separate effectively risk assessment from risk management;
- ▶ the inherent limitations of the substance-by-substance approach;
- ▶ the overly strict criteria for equivalency agreements;
- ▶ the absence of an administrative penalty scheme; and
- ▶ inadequate powers under Part IV to regulate federal activities.

The Evaluation Report also concluded that CEPA needs to include seven key elements:

- ▶ a statement of ecosystem quality and human health objectives;
- ▶ moral leadership by, among other things, setting a high standard in federal government activities;
- ▶ the ability to meet international obligations with respect to toxic substances;
- ▶ excellent science;
- ▶ mechanisms and processes that permit the efficient and effective identification, assessment and control of high-priority toxic substances;
- ▶ a consistent, clear, and non-duplicative control regime; and
- ▶ fair and consistent enforcement.

The Standing Committee on Environment and Sustainable Development

The Committee has eleven members from the three major parties in the House of Commons. The Standing Committee began its Review of CEPA in June 1994. The Members of the Committee during the year were:

CHAIR	Charles Caccia, Chairperson, M.P., for Davenport
VICE-CHAIRS	Karen Kraft Sloan, M.P., for York—Simcoe Monique Guay, M.P., for Laurentides
MEMBERS	Peter Adams, M.P., for Peterborough Paul DeVillers, M.P., for Simcoe North John Finlay, M.P., for Oxford Paul E. Forseth, M.P., for New Westminster—Burnaby Bill Gilmour, M.P., for Comox—Alberni Clifford Lincoln, M.P., for Lachine—Lac-Saint-Louis Pat O'Brien, M.P., for London—Middlesex Benoît Sauvageau, M.P., for Terrebonne
ASSOCIATE MEMBERS	Jim Abbott, M.P., for Kootenay East Rex Crawford, M.P., for Kent Stan Dromisky, M.P., for Thunder Bay—Atikokan Bob Mills, M.P., for Red Deer Len Taylor, M.P., for the Battlefords—Meadow Lake Andrew Telegdi, M.P., for Waterloo
CLERK of the COMMITTEE	Normand Radford
RESEARCH STAFF of the COMMITTEE	Pascale Collas (Research Branch, Library of Parliament) Thomas Curran (Research Branch, Library of Parliament) Monique Hébert (Research Branch, Library of Parliament) Margaret Smith (Research Branch, Library of Parliament) Ruth Wherry (Seconded to the Committee by Environment Canada) François Bregha (Resource Futures International) John Moffet (Resource Futures International)
OTHER STAFF	Susan Waters

The Standing Committee has conducted an extensive Review of CEPA. In the process, the Committee heard from approximately 200 witnesses and analysed over 120 substantive submissions. The Committee also travelled across Canada and met with the Canadian Council of Ministers of the Environment (CCME) in Bathurst, New Brunswick on November 8, 1994.

The Standing Committee is expected to table its report on CEPA in June, 1995. Government then has 150 days to respond.

Sharing our Responsibility for the Environment

Environment Canada supports the principle that protection and conservation are shared responsibilities among all Canadians and by all jurisdictions. Environment Canada continues to reaffirm the importance of public consultation in the design of its policies and in the development of its programs and the delivery of its services. Forging partnerships is a basic way of doing business at Environment Canada.

CEPA's Channels for Cooperative Action

Included in CEPA's structure are opportunities for governments and experts in relevant disciplines to consult and to coordinate their efforts. Mechanisms for this consultation and coordination include advisory panels, the Federal-Provincial Advisory Committee and its working groups and agreements with the provinces and territories.

Advisory Panels

The Ministers of the Environment and Health appoint experts from interest groups, industry and the academic community to advisory panels. One of these, the Expert Advisory Panel for Priority Substances, will advise the Ministers of Environment and Health on CEPA's second Priority Substances List (PSL II) in 1995. Panel members represent labour, health and environmental groups, academia, industry and the provincial, territorial and federal governments. The Government appointed the Advisory Panel in December 1994.

Federal-Provincial Advisory Committee

The Federal-Provincial Advisory Committee (FPAC) is comprised of representatives from Environment Canada, Health Canada and each of the provinces/territories. The Committee ensures that they work cooperatively to achieve early and effective consultation on environmental protection and toxic substances management initiatives.

During the past year, FPAC has concentrated its efforts on the Strategic Options Process (SOP) which aims to effectively respond to environmental issues within a pollution prevention context in a manner which is open, transparent and where accountability is clearly defined. In 1994/95 the SOP was used to develop responses to the substances declared toxic under CEPA through the Priority Substances Assessment Process. It may be applied to other priority areas in the years to follow.

One other important issue that FPAC has been kept abreast of throughout the year is the development of the federal Toxic Substances Management Policy which aims to ensure the protection of human health and the environment. Members participated in workshops, bilateral meetings, teleconferences and special meetings dealing/focussing on the evolution of this Policy.

FPAC dealt with a number of other issues throughout the year such as the development of the Federal Strategy for Pollution Prevention, Environmental Protection Regimes on Indian Lands, Long Range Transport of Persistent Organic Chemicals, Municipal Wastewater Effluents and CEPA Review. The Committee has also been involved with the work of the Ministers' Expert Advisory Panel on the PSL II by providing comments on the screening criteria and by nominating substances. In addition, the Committee was consulted on a regular basis on Environment Canada's regulatory initiatives relating to CEPA.

The Federal-Provincial Working Group on Air Quality Guidelines and Objectives

In the past the Working Group on Air Quality Objectives and Guidelines has prepared recommendations ready for tabling air quality objectives for hydrogen fluoride and carbon monoxide based on a review of the current science. Objectives currently under review are fine particulate matter, total reduced sulphur, and nitrogen dioxide. The Working Group has compiled the scientific review document for particulate matter, as the first step towards recommending objectives.

In association with the NO_x / VOC Management Plan Science Program, the Working Group is also developing recommendations for revising ground-level ozone objectives for the protection of health and vegetation.

It has become evident to the working group members that the current three-tiered framework for air quality objectives should be re-visited. It is the intent of the Working Group to recommend a framework which is more scientifically justifiable. In parallel with this effort, an air quality objectives derivation protocol is being developed. This will provide consistency with guideline development in other media. It will also formalize the process by which the scientific information is reviewed and recommendations for air quality objectives are developed. A first draft of the protocol has been prepared.

Agreements With the Provinces and Territories

Subsection 34 (6) and section 98 of CEPA provide for the federal government to enter into equivalency and administrative agreements, respectively, with the provinces and territories as part of CEPA's legislative framework. In the mid-eighties, when CEPA was being developed, the inclusion of such provisions in CEPA was as seen as an effective means to achieving greater efficiency in the administration of CEPA while minimizing duplicative activities.

Agreements are recognized as invaluable cooperative tools for federal and provincial governments to attain common environmental protection goals on mutually acceptable terms in an administratively efficient manner. For instance, they reduce overlapping and duplicative activities of the federal and provincial governments by providing a single government contact point to industrial sectors for reporting purposes. This administrative efficiency is achieved while ensuring environmental standards remain consistent.

The 1994-95 fiscal year was a very busy year for Environment Canada with respect to the conclusion and signing of federal-provincial agreements. On behalf of the federal government, Environment Canada made significant progress in concluding numerous bilateral agreements both pursuant to CEPA and pursuant to the *Department of Environment Act* and the *Fisheries Act* (jointly with the Minister of Fisheries and Oceans).

Equivalency Agreements

Equivalency agreements are an effective means to eliminating overlap and duplication in the administration of federal and provincial regulations. As such, they are partnerships that suspend all application of a federal CEPA regulation in a province or territory by recognizing an equivalent provincial or territorial regulation. The provincial or territorial regulations need not be worded exactly the same as the federal regulations to be considered equivalent, but they must achieve an equal or equivalent effect. Under an equivalency agreement, CEPA still applies to Her Majesty in Right of Canada (e.g. federal lands and facilities) and the federal government retains its responsibility for reporting annually to Parliament on the administration of equivalency agreements.

Agreement on the Equivalency of Federal and Alberta Regulations on the Control of Toxic Substances in Alberta

This is the first CEPA equivalency agreement to be concluded; it was signed on June 1, 1994. Under this agreement, the *Secondary Lead Smelter Release Regulations*, the *Vinyl Chloride Regulations*, the *Pulp and Paper Mill Dioxins and Furans Regulations*, and the use portion of the *Pulp and Paper Mill Defoamer and Wood Chips Regulations* pursuant to CEPA no longer apply in Alberta. As alluded to above, these regulations will continue to apply to Her Majesty in Right of Canada in the province of Alberta.

This agreement allows for a continued high level of environmental protection while achieving efficiencies in the government-industry relationship by providing a single government point of contact for industry. It will remain in effect until terminated by one of the Parties.

Administrative Agreements

Administrative agreements are “work-sharing” partnerships that allow federal and provincial/territorial governments to share the work of administering regulations. They can cover such activities as inspection, enforcement, monitoring and reporting, but do not release any of the parties from their respective responsibilities. Under an administrative agreement, the federal government remains accountable to the Canadian people through Parliament and therefore must report annually to Parliament on the agreement.

Over the past year, Minister Copps signed the following administrative agreements with provinces on behalf of the Government of Canada:

Canada-Quebec Agreement Respecting Pulp and Paper

On May 6, 1994, the above-noted administrative agreement, designed to harmonize the administration of federal and provincial environmental regulations governing pulp and paper mills in Quebec, was signed. The agreement makes the Quebec government the sole governmental representative in dealings with Quebec pulp and paper mills. It covers regulations for the pulp and paper sector under CEPA, the *Fisheries Act* and Quebec's *Loi sur la qualité de l'environnement*. The agreement does not alter either federal or provincial regulations. It stipulates that the Quebec government, when enforcing its pulp and paper regulations, will provide the federal government with information so that the federal government can ensure compliance with federal regulations. Federal regulations will continue to apply to all pulp and paper mills throughout Quebec, and as with all administrative agreements, both governments retain power to act unilaterally in enforcing their respective regulations. This agreement will be in effect until January 1, 1996.

Canada-Saskatchewan Administrative Agreement for the Canadian Environmental Protection Act

This agreement was signed and came into force on September 15, 1994. It establishes a work-sharing arrangement for the cooperative administration of federal and provincial environmental legislation and focuses on such areas as releases, compliance promotion and compliance verification, investigations and enforcement. It will remain in effect until one of the Parties wishes to terminate it.

Agreement on the Administration of Federal and Provincial Legislation for the Control of Effluents from Pulp and Paper Mills in the Province of British Columbia

Signed in Vancouver on September 19, 1994 and in force until March 31, 1996, this administrative agreement covers pulp and paper industry sector regulations under CEPA and the *Fisheries Act*, as well as complementary provincial legislation. Under this agreement, the province of British Columbia will be solely responsible for conveying monitoring and information requirements to the pulp and paper industry, conducting the jointly developed inspection program (with federal participation in selected joint inspections), and generally leading in investigations of suspected violations. The federal and provincial governments will work together to develop a data reporting system with full and prompt access for both parties.

Implementation of Agreements

As the above-noted agreements were signed in 1994-95, Environment Canada worked with the respective provincial governments this past year in putting the structures and processes in place to implement them. Activities, therefore, generally concentrated on establishing management committees, designing and delivering training programs for provincial employees to obtain designation as CEPA inspectors, taking the necessary steps to put into place data management systems, establishing processes for “single window” reporting to government, and establishing priorities for compliance verification and promotion.

Further detail on individual agreements is contained in the section "CEPA Across Canada" which describes activities undertaken in Environment Canada's Regional Offices.

Future Agreements

Discussions continue with several provinces and territories on the development of several additional administrative and equivalency agreements pursuant to CEPA.

CEPA Part I: Environmental Quality

Research and Monitoring

To establish fair restrictions and foster the development of new technologies to meet them, the federal government supports research and monitoring activities. It uses scientific information from these activities to verify the progress of regulations, agreements and other non-regulatory instruments. To ensure that the public has access to accurate environmental information, the Government also publishes results of these activities.

CEPA Part I authorizes Environment Canada, a major science and technology department, to undertake research and development on a variety of fronts. Five Environment Canada science institutes make direct contributions to CEPA. Research not related to CEPA is not reported here.

Health Canada also conducts toxicology research and exposure monitoring to identify hazardous substances and their adverse effects on health.

Environmental Technology Centre

The Environmental Technology Centre, near Ottawa, coordinates the federal-provincial National Air Pollution Surveillance (NAPS) Network. This system, which measures ambient air quality, comprises 140 monitoring stations using more than 400 instruments in 52 urban centres across Canada.

In 1994-95, the Centre provided air monitoring instrumentation, technical assistance, calibration materials, analytical laboratory support, and program direction to cooperating agencies. The air quality data, which are maintained and archived in a computer database, are published in annual data reports and various special reports for air quality data analysts in Canada and abroad. Working with Health Canada and the Atmospheric Environment Service, the Centre monitored eight sites for acid aerosols, which are known to cause health problems.

The Centre participated in a technology development and demonstration exercise as a "scientific partner" in the Asea Brown Boveri Canadian Biomass Fluid Bed Demonstration Project to evaluate the combustion of biomass/sludge mixtures in a commercial-scale Bubbling Fluid Bed. The Centre also witnessed the Triwaste Thermal Phase Separator soil remediation tests at orphaned sites in Cremona (Alberta) and Makinsons (Newfoundland) on behalf of the Atlantic Region and the province of Newfoundland and Labrador. Technical and logistical support was provided for a continuous emissions monitoring course covering the performance-based protocols related to the regulations and CCME guidelines for gas turbines, commercial and industrial boilers, and power plants. Technical support was provided to the Regions in the implementation of the National Inspection Plan (e.g. the witnessing of on-site compliance tests, CEPA inspectors training, and review of test plans and results).

The Centre (in cooperation with the provinces and municipalities) maintained an extensive ambient air toxics sampling network, consisting of over 40 urban and rural sites. Volatile organic compounds (VOCs), semi-volatile organics, fine particulates and metals are measured in the program. Data related to VOC implicated in ground-level ozone formation, are provided to the NO_x/VOC Science Program. Methods for measuring polar VOC and biogenic VOC were also successfully applied.

The Centre also operates a vehicle emissions testing laboratory. During the past year, the laboratory completed a variety of joint projects, including some with:

-
- ▶ Transport Canada to determine the compliance of the 1995 new-model-year, light-duty vehicles with the federal standards for exhaust and evaporative emissions;
 - ▶ Canada Post, Brewer's Retail, Steelcase Transport, and Engine Control Systems to study the emissions-reduction performance of 'flow-through' catalysts and diesel particulate traps in heavy-duty truck applications;
 - ▶ Engine Control Systems (ECS) and Wisconsin Engines to conduct certification engine testing on utility engines using an ECS oxidation catalyst; and
 - ▶ the Canadian Coast Guard to evaluate the hydrocarbon emissions from marine petroleum bulk carriers while at sea and in port loading and unloading.

In support of CEPA and related guidelines, the Centre also helped to develop Reference Methods to measure toxic substances and associated quality assurance programs. For example, the Centre:

- ▶ issued the fourth in a series of certification samples under a joint agreement with the Canadian Association of Environmental Analytical Laboratories for anions and metals on air filters, and polychlorinated biphenyls (PCBs) in Oil;
- ▶ completed the first draft of a new Reference Method for regulations under CEPA for PCBs in a variety of environmental media;
- ▶ participated in a joint government-industry group to measure the polyaromatic hydrocarbons (PAHs) content of fuels;
- ▶ participated in a study with the Canadian General Standards Board to revise the methods for the analysis of sulphur in diesel fuel to be used under government-industry guidelines;
- ▶ undertook research and development on the use of capillary electrophoresis for the improved analysis of air samples.; and
- ▶ licensed a company to use the patented Microwave-Assisted Process (MAP™) for extracting chemicals from samples for analysis, and two companies to use the process at large scale for environmentally friendly industrial extractions.

Under section 7 of CEPA, the Centre is authorized to conduct pollution research and develop methods to control pollution. As part of this mandate, the Centre worked with private and public agencies inside and outside Canada to investigate the properties, behaviour, fate and effects of oil and chemical spills. It also undertook technology development and demonstration work on oil-spill containment booms, oil skimmers, spill-treating agents, spill modeling, soil and water decontamination technologies, and remote sensing. During the year, for example, the Centre and its domestic and international partners:

- ▶ completed testing of an operational airborne oil spill remote system, and started design of a new generation of laser-based sensors;
- ▶ developed and obtained a Canadian patent for an adsorption-micro filtration process for removing arsenic from water;
- ▶ developed standard protocols for testing spill countermeasures technology, and evaluated the performance of six generic types of oil spill skimming devices; and
- ▶ analyzed and published data from a major oil slick burn experiment conducted off Newfoundland.

Wastewater Technology Centre

Established in 1971, the Wastewater Technology Centre (WTC) in Burlington, Ontario, has become the foremost Canadian facility for treatment and disposal technologies for municipal and industrial wastewater and residues, as well as site remediation.

The Wastewater Technology Centre is managed as a government-owned, contractor-operated (GOCO) research and technology development facility.

In 1994-95, the Centre was involved in ongoing and new projects. Researchers continued work on innovative and cost-effective ways to reduce phosphorous and ammonia to very low levels in municipal sewage treatment plants, as well as to control and manage combined sewer overflows and stormwater

discharges. Work also continued on optimizing the operation of municipal and industrial wastewater facilities, and the evaluation of innovative pollution control technologies.

In the remediation area, researchers continue to focus on developing and evaluating new technologies to remediate contaminated sites, including destroying or removing contaminants from groundwater, soils and sediments, as well as protocols for evaluating and regulating the disposal of solidified wastes.

In line with the national direction, the Centre has shifted its industrial research emphasis to pollution prevention from "end-of-the-pipe" treatment technologies. This shift includes the establishment of a new Clean Technology Centre, adjacent to and integrated with the WTC pilot plant building.

The Centre has made substantial progress in several industry sectors on quantifying the use of toxics, identifying options for source reduction, in-stream recovery or recycling, and assessing the efficiency of innovative technologies. The primary focus continues to be on metal finishing, automotive parts manufacturing, printing and graphic arts, textile, chemical, pulp and paper industries, and aircraft maintenance and painting facilities. In 1994, the Centre established an industrial waste audit program (IWAP) to assist industrial clients.

Additional emphasis was given to helping Canadian industry showcase its technology, and to facilitating technology transfer nationally and internationally, particularly with Mexico and China.

National Water Research Institute

The National Water Research Institute (NWRI) in Burlington, Ontario, is Canada's largest freshwater research establishment. In partnership with Canadian and international freshwater scientists, NWRI conducts a national program of research and development in the aquatic sciences to examine current and emerging water quality problems in Canada.

In 1994-95, NWRI scientists participated on the PSL II committee that reviewed Environment Canada's candidate chemical list for PSL II and served on the PSL II support network to the departmental secretariat; continued to address the research priorities and data gaps identified in the PSL I reports on chlorinated paraffins, non-pesticidal organotin compounds, fluoride, and several of the chlorobenzenes. Studies are also continuing on the effects of pulp-and-paper and mining effluents on the aquatic ecosystems, and on the source, transport, effects of organic contaminants in the Arctic and in the Great Lakes.

It was not possible to assess whether chlorinated paraffins were "toxic" as defined under paragraph 11(a) of CEPA because no data were identified on their concentrations in the Canadian environment. Samples of sediments, native freshwater mussels, zebra mussels, and fish were collected in the St. Lawrence River in the vicinity of the only Canadian manufacturing site of chlorinated paraffins. The only sample which was confirmed, so far, to contain chlorinated paraffins was the effluent sample, the total concentration was about 13 µg/L, calculated as the medium-chain chlorinated paraffin Cereclor S52. In 1995-96, this work will be extended to the determination of chlorinated paraffins in the environment near industrial areas in Montreal, Toronto and Hamilton.

The PSL report on non-pesticidal organotin compounds recommended that their current environmental concentrations be determined. NWRI initiated a national survey of water and sediment from 100 locations and sewage treatment plant (STP) influents and effluents from 15 STPs across Canada. Preliminary results indicate a substantial decrease in the concentrations of the various butyltin and methyltin species in water from many locations that were sampled in earlier surveys before 1989. The highest concentration observed for tributyltin in water is 18 ng/L, as opposed to 2300 ng/L prior to 1989. It should be noted that a concentration of 18 ng/L would still be "toxic" as defined under CEPA. This work will be extended to study organotin levels in fish and shellfish, and correlations with toxic effects.

NWRI continued a study on the toxicity of sediment-associated fluoride to freshwater benthic organisms. Fluoride-contaminated sediments near an aluminum smelter on the St. Lawrence River were found to be toxic. However, fluoride was not the primary toxic agent. The toxic thresholds of sediment-bound fluoride to four benthic organisms was also determined. The amphipod, *Hyalella azteca*, was the

most sensitive to fluoride. The highest concentrations reported to occur in sediments near major industrial sources in Canada would be expected to cause reductions in the growth and/or survival of the amphipod, *H. azteca*, the mayfly, *Hexagenia limbata*, and the midge, *Chironomus tentans*, but not to the fathead minnow, *Pimephales promelas*. These results show that there is potential for sediment-associated fluoride to have harmful effects on at least some types of benthic organisms in the Canadian environment.

CEPA assessment reports on all chlorobenzenes concluded that "although significant exposure of benthic organisms in sediment may be occurring in specific aquatic ecosystems in Canada, adequate data on the toxicological effects on these organisms were not identified". In 1994-95, NWRI, together with the Atlantic Region, initiated research to provide the necessary information on 1) the toxicity of the chlorobenzenes to marine and freshwater benthic invertebrates, and 2) the environmental occurrence and toxicity of field collected sediments. The toxicity of 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,3,5-trichlorobenzene and 1,2,4,5-tetrachlorobenzene to two species of freshwater invertebrates (i.e., the mayfly, *Hexagenia spp.* and the oligochaete worm, *Tubifex Tubifex*), one species of marine amphipod, the sea urchin and the Microtox™ screening bioassay was determined. Little toxicity to any of the organisms tested was observed for any of the chlorobenzenes tested with the exception of 1,4-dichlorobenzene which was toxic at nominal concentration > 50 µg/g bulk sediment. A full report on the results of this collaborative study is expected in 1995-96.

In cooperation with Fisheries and Oceans Canada, Industry Canada, the Pulp and Paper Research Institute of Canada (PAPRICAN), several pulp mills and three Canadian universities, NWRI continued its research to close information gaps identified in the CEPA Assessment of Effluents from Pulp Mills using Bleaching. This program has already resulted in new methods to test effluents for their capacity to cause sub-lethal effects in fish. Using these methods in combination with effluent fractionation, results from the Toxicity Identification and Evaluation (TIE) study of pulp mill effluents have clearly demonstrated that the worst of the toxic and sub-lethal effects on aquatic ecosystems can be controlled through chlorine substitution (use of chlorine dioxide in place of elemental chlorine) in the plant bleaching process. However, a number of previously masked lesser effects are then observed which are due to non-chlorinated substances from a variety of sources including the wood itself. These results were presented and confirmed at a major gathering of relevant international researchers in Vancouver: the Second International Conference on Environmental Fate and Effects of Bleached Pulp Mill Effluents, November 6 to 10, 1994. Investigations continue.

Several reports were published on the results of multidisciplinary studies on the environmental effects of metals and trace elements released from past and present mining activities in British Columbia and Ontario. Studies have been carried out to evaluate the feasibility of subaqueous disposal of acid drainage generating mine wastes into natural lakes and man-made reservoirs. The study done in cooperation with mining companies and university will continue in 1995-96.

Under the interdepartmental Arctic Environmental Strategy, NWRI is examining the source, transport, fate and effects of organochlorines (OCs), PCBs, chlorobenzenes (CBs) and PAHs. There are three studies: contaminants deposited by rivers into the Arctic Ocean; atmospheric depositional fluxes measured in fresh snow, accumulated snowpack and ice cores; and mass balance assessments of arctic lake systems (Amituk Lake on Cornwallis Island and Lake Laberge near Whitehorse). Work on the deposition and net flux of organic contaminants to the Great Lakes continues. The results were summarized at a special review meeting in Windsor, Ontario, in June 1994. The net fluxes of most of the OCs are out of the system via volatilization; only α -HCH showed a net input from the atmosphere.

Canadian Wildlife Service

The Canadian Wildlife Service (CWS) conducts CEPA research and monitoring at its National Wildlife Research Centre (NWRC) in Ottawa-Hull and regional offices. By detecting and measuring the effects of toxic substances on wildlife, CWS researchers can assess the overall health of species, predict the impact of pollutants, and provide an early warning system for potential environmental and human health problems.

During 1994-95, the Canadian Wildlife Service (CWS) in conjunction with provincial/territorial wildlife agencies and local hunters, collected waterfowl and other game birds from six communities throughout the Yukon Territory and 14 designated areas throughout British Columbia for chemical analyses as part of a national CWS assessment of the toxic contaminant levels in wild foods. Recommendations from Health Canada based on residue data collected during 1988-1992 for samples from Ontario and Quebec have been made available to the public. Contaminant levels found in those waterfowl were, for the most part, either non-detectable or very low and were not considered to pose a hazard to the health of consumers.

A monitoring study, around the northern hemisphere, of chlorinated hydrocarbon contaminants (CHCs) in polar bears from eastern Russia, Alaska, North America, Greenland and Svalbard was completed. The data show relatively uniform distribution of a number of contaminants, including the pesticides hexachlorocyclohexane and chlordane, and the industrial contaminants, chlorobenzenes, throughout the hemisphere. PCB levels were significantly higher in eastern Greenland and Svalbard, reflecting combined North American and European sources. Another peak in PCBs occurred in the Arctic Ocean near Prince Patrick Island. This peak may be explained by differences in feeding ecology in this area. The pesticides, DDT and dieldrin, tended to increase from west to east in the western hemisphere, probably reflecting the influence of North American land and lake surfaces as sources to the Arctic via atmospheric transport. The liver enzyme system of the polar bear was characterized. Activities and levels of the enzyme induced by dioxin-like compounds were shown to be high and correlated to PCBs, indicating the possibility of biological effects.

A comprehensive review of the environmental impacts of lead shotshell ammunition and lead fishing sinkers in Canada was completed. This report provides the scientific basis for the development of a CWS policy on lead sinkers, and will allow the CWS nontoxic shot zoning policy to evolve toward a policy of broader controls on the use of lead shot for hunting and target shooting. The report will be published in the summer of 1995.

A chicken embryo hepatocyte (CEH) bioassay developed at NWRC was used to provide strong evidence that current levels of non-polar organic contaminants in some areas of the Great Lakes remain high enough to cause elevated porphyrins in livers of herring gulls. The toxicological consequence of these elevated porphyrins is not known because the porphyrin levels are, at most only 15-fold higher than normal levels. Severe porphyria results in levels that 1,000 to 10,000 times normal. This research has validated the usefulness of porphyrins in herring gulls as a biochemical marker of exposure to non-polar organic contaminants. Collaborative research with scientists at the National Water Research Institute has demonstrated that the CEH bioassay has considerable potential in helping identify toxic chemicals in pulp mill effluent. Two major improvements were made to the biochemical assays used in the CEH bioassay and two papers describing these methods were published in the scientific literature. NWRC successfully transferred these new methods to several laboratories in Canada, the United States and Europe.

Field surveys conducted during the spring and summer of 1994 indicate that herring gulls breeding on Lake Superior are in poorer condition, lay smaller eggs and experience lower reproductive success than populations measured on the lower Great Lakes. Furthermore, the number of breeding pairs occurring at two monitoring colonies on Lake Superior have declined steadily in the past three years. Analysis of diet remains indicate the pairs producing the fewest young tend to eat garbage while the more successful pairs (found on Lake Erie) consume primarily fish. The availability of a high protein fish diet may be limited on Lake Superior which, in turn, is affecting the reproductive performance of birds breeding in numerous colonies along its northeastern shore. Research will continue by developing early warning biomarkers of nutritional status in fish-eating birds.

As part of a collaborative project with McMaster University, NWRC studies the relationships between the mutation rate of DNA in herring gulls and the exposure to PAHs. Preliminary results suggest that fewer mutations occur on less contaminated sites when compared with more contaminated sites, such as Hamilton Harbour. CWS also collaborated with researchers from the University of Windsor and McGill

University to examine the effects of zebra mussels on levels of contaminants in fish-eating birds in Lake Erie, and the effects of feeding Lake Erie zebra mussels to captive scaup. This was ongoing in 1994-95.

Blood samples from eight week-old bald eagle chicks were obtained from the Ontario Ministry of Natural Resources which had been collected from nests located along the Canadian Great Lakes from 1991 to 1994. Organochlorine analysis revealed relatively low levels of total PCBs and DDE. Blood lead levels were generally extremely low. These results indicate the eagle chicks do not appear to be exposed to significant levels of persistent organic contaminants.

Laboratory services for support of the wildlife toxicology research and monitoring are located at the National Wildlife Research Centre. This year, over 7,000 wildlife samples were processed for various analyses including 850 for organic contaminants, 5,000 for metals and 3000 for a variety of biomarkers (measures of biochemical and physiological effects). The expansion of the National Specimen Bank facility was completed. This bank houses Canada's largest collection of deep frozen (-40 to -105°C) wildlife tissues to be used for retrospective analyses of contaminants and certain biomarker trends. The laboratory added a number of new tests methods to its arsenal including measurement of polyaromatic hydrocarbon in avian and amphibian bile, vitamin A metabolites in vertebrate livers and a method for collection of avian blood on filter paper to facilitate transport from the field for subsequent testing.

CWS Atlantic Region

In the Atlantic Region, CWS continued to assess the effects of pollution at five Atlantic Coastal Action Program (ACAP) sites. This initiative included volunteer wildlife surveys to assess potential exposure to toxic chemicals, and monitoring of contaminant levels in indicator species such as bald eagles, ospreys and tree swallows. In a joint project with the Atlantic Veterinary College (AVC), carcasses of dead fish-eating birds found in the Atlantic Region by the public and government agencies were collected for post-mortem examination and toxicological analysis. Fifteen dead loons, 16 bald eagles and 10 ospreys were examined at AVC and preliminary lab results indicate that many of the loons had unhealthy levels of lead or mercury.

CWS Quebec Region

In Quebec Region, studies of mercury contamination of osprey in hydroelectric reservoirs indicated that while both adults and young have elevated levels, no effects on reproduction were noted. In a similar study, no effects were observed on the health of herring gulls, mergansers and mink that were exposed to dioxins and furans discharged in the effluents of a pulp and paper mill in the Saint-Maurice River. Surveys of the contaminants in terrestrial wildlife continued: preliminary results indicate low levels of mercury in golden eagles compared to bald eagles. Research to identify wildlife indicators for monitoring clean-up of contamination of the St. Lawrence River has progressed to the point of finalizing selection of species and sites for the next year. As well, the levels of selenium in three species of sea ducks along the St. Lawrence shoreline and from the Northern interior will be surveyed to determine their safety for human consumption.

CWS Ontario Region

In Ontario Region, populations of double-crested cormorants on Lake Ontario decreased by approximately 10% and may be responding to density-dependent factors. Cormorants had been increasing dramatically for the last 10 to 15 years in response to reduced contaminant levels and abundant fish stocks. The Herring Gull Egg Monitoring program is in its 22nd year and tracks both temporal and spatial trends of contaminants. Studies in western Lake Erie have shown that zebra mussels have had no effect on gull and cormorant populations.

The mudpuppy, a long-lived, sedentary amphibian of the lower Great Lakes continues to show promise as an indicator species. Contaminant levels and effects in mudpuppies from Lakes Ontario and Erie and the Detroit and St. Clair Rivers were assessed to determine baseline information on wildlife health in areas of concern in the Great Lakes prior to remediation. In apple orchards in southern Ontario, studies

are continuing to assess the impacts of agricultural sprays on the immune systems of tree swallows and Eastern bluebirds nesting in the orchards. A large volunteer project (involving 700 volunteers) is being co-organized with Long Point Bird Observatory to monitor bird and amphibian populations in marshes in all 42 areas of concern (Canadian and U.S.) and other priority areas.

Major partnerships have been established throughout southern Ontario where nest platforms have been erected to encourage nesting by ospreys, bald eagles and peregrine falcons. The populations were nearly annihilated on the Great Lakes due to the effects of toxic chemicals. Recent studies of ospreys have shown no major population effects at current contaminant levels. Birds are now nesting in some areas of concern.

CWS Prairie and Northern

In Prairie and Northern Region, a study is being done on the Wapiti and North Saskatchewan Rivers to evaluate whether riparian wildlife is being exposed to and affected by feeding on pulp mill effluent-exposed prey. This study will assess whether existing Environmental Effects Monitoring Guidelines for Aquatic Biota adequately interpret the effects of pulp and paper mill effluents on riparian wildlife.

A study on lead exposure in bald eagles and golden eagles continues in the prairie provinces. Lead poisoning is an important mortality factor in eagles found dead in the prairie provinces, accounting for more than 10% of the total mortality. However, a relatively small percentage of live eagles migrating through the Prairies show evidence of exposure to lead.

Contaminant levels in a small sample of muskrats and canvasback ducks were examined in the Peace-Athabasca Delta. From a socio-economic perspective, these species are important to residents of the Delta. Chlorinated hydrocarbon concentrations were extremely low in these species. There was some evidence that the low levels of some of the dioxins, furans and chlorophenols in these animals originated from pulp mill sources hundreds of kilometers upstream. None of the contaminants were deemed to be present in the animals at levels that were high enough to be toxic. Health Canada concluded that contaminant levels in these animals would not pose a hazard to people eating them.

CWS Pacific and Yukon

In British Columbia, dioxin and furan levels in herons and cormorants from the Strait of Georgia have stabilized following an initial decline after implementation of federal and provincial regulations. Bald eagles, which prey on both fish and fish-eating birds, have the highest levels monitored to date, and research is continuing on toxicological effects. It is not known whether the continuing moderate levels are the result of past discharges of pulp mill effluents, or ongoing sources such as air emissions from power boilers using salt-laden logs (sea salt supplies the chlorine needed for chlorination of the compounds). In the interior, uptake of dioxin and furan and other organochlorine contaminants in osprey, through aquatic food webs, continues on both the Fraser and Columbia River systems. Toxicological research on osprey on the Thompson River (tributary to the Fraser) is being initiated in 1995. On the lower Columbia River, osprey eggs also have elevated PCB levels, although a specific source is not known.

National Hydrology Research Institute

Located in Saskatoon, the National Hydrology Research Institute (NHRI) of Environment Canada conducts research on environmental issues related to the integrity and sustainability of Canada's aquatic ecosystem. In collaboration with many national and international partners in universities, government agencies, other research facilities, and the private sector NHRI participates in interdisciplinary research programs addressing regional, national, and international environmental problems.

In 1994-95, NHRI continued its involvement in two major federal/provincial research programs investigating the effects of contaminants on large river systems. Under the Fraser River Action Plan and the Northern River Basins Study, Institute scientists are assessing the effects of pulp mill effluents on aquatic ecosystem integrity and developing new bioassays for ecotoxicological assessment. A current

project is to develop stable isotope analytical methods for determining the extent to which effluents are incorporated and dispersed in downstream foodwebs.

In the North, a research study continues on the role played by snowcover in controlling the release of inorganic contaminants, accumulated in the snowpack, and on their impacts on northern ecosystems. On the Prairies, current research projects include a study of the impacts of agrochemicals on prairie wetland ecosystems. To improve detection methods, a new technique for extracting lipids from aquatic invertebrates to analyze for contaminant levels has been developed.

In related research, scientists have developed a new probe mass spectrometry technique for measuring trace levels of contaminants in aquatic biota. A major benefit of the new technique is that it permits detection of trace levels of pesticides but requires a much smaller number of organisms for analysis, significantly reducing costs and time involved. Innovative mass spectrometry techniques also play a large part in another NHRI project to characterize the nitrogenous contaminants in the ground water at sour-gas plants. Results to date suggest that these techniques are well-suited for other hydrophilic contaminants, including glycols.

In partnership with industry, groundwater specialists are continuing their research into the development of biotechnological techniques, such as biobarriers, and bioremediation technologies for *in situ* treatment of contaminated sites.

Atmospheric Environment Service

Atmospheric Environment Service (AES), in collaboration with the regional components of the Department of the Environment, is responsible for the development and delivery of scientific information on the weather, atmospheric air quality issues, climate change and water resources.

In 1994-95, AES scientists participated on the PSL II committee that reviewed Environment Canada's candidate chemical list for PSL II and served on the PSL II support network to the departmental secretariat. Studies focussed on air pathways of toxic chemicals and on the "air criteria" for defining a toxic substance. While atmospheric levels of many toxic chemicals are very low, these chemicals can bioaccumulate to more significant levels throughout the ecosystem.

Monitoring of levels of metals and organochlorines in the atmosphere at background sites in the Great Lakes Basin and the Arctic was carried out. Preliminary analysis of the data indicates that sources to the atmosphere of these trace chemicals are both inside Canada and international. For example, high background measurements of arsenic/selenium ratios in the atmosphere were circumstantially linked to atmospheric flow from some of Canada's large smelters. A modeling program is being developed to address this, initially focussing on long range transport of sulphur compounds to the Arctic, but moving on to organochlorines as soon as inventories are available.

A chemical reaction "chamber" has been established at York University collaboratively with several partners through the Canadian Institute for Research in Atmospheric Chemistry (CIRAC).

A Canadian Global Emissions Inventory Center was established in partnership with ORTECH Int. to participate in international programs to develop global inventories for the use of atmospheric modelers worldwide. A global standard two level, seasonal inventory of SO_x/NO_x was developed and submitted for publication and a global lead inventory is under development.

A data base system (RDMQ) was developed to handle atmospheric contaminant data for quality assurance and control purposes. This data base was accepted for use by all the other agencies participating in the Great Lakes program.

A special review meeting was organized by AES in Windsor, Ontario in June 1994, to assess the state of knowledge of Canadian and U.S. research organizations on the net flux of contaminants to the Great Lakes. Results indicate some interesting implications for regulators; for example, the net flux of PCBs was out of the lakes via volatilization. Results also reconfirm that the atmosphere is a very important pathway of toxic chemicals into the Great Lakes, one that must not be neglected in developing management programs.

AES also has active research programs on ozone depletion and climate change which support a number of Canada's international commitments. AES runs the World Ozone and Ultraviolet Radiation Data Centre (WOUDC) which processes, archives and publishes world ozone data reported by over 300 stations. In addition, high resolution ultraviolet (UV) spectral data is submitted yearly by Japan and Canada to be posted on the file transfer protocol (ftp) server for worldwide use. AES is, of course, the caretaker of Canada's climate data. AES's GCM, being supported and developed by the group in Victoria, is providing global climate scenarios, and an active climate adaptation program is encouraging the incorporation of climate change into future planning activities. The major areas of focus for adaptation research are the Great Lakes Basin and the Mackenzie River area.

The Working Group on Air Quality Objectives and Guidelines met last May and has:

- ▶ Prepared draft recommendations for National Ambient Air Quality Objectives for Hydrogen Fluoride and Carbon Monoxide to be presented to CEPA/FPAC in April 1995. Economic impact assessments for these recommendations have begun.
- ▶ Continued discussion with CEPA/FPAC on the process for implementing the economic assessment and stakeholder consultations, and for taking the Working Group recommendations through to publication in the *Canada Gazette*.
- ▶ Initiated the development of protocol documents for recommending effects-based air quality objectives to protect human health and the environment.
- ▶ Continued the scientific review of environmental and health effects of particulate matter and ground-level ozone. The tentative completion date for these reviews is December 1995.
- ▶ Initiated contract work for the scientific review of nitrogen dioxide.
- ▶ Reviewed the plans for the Total Reduced Sulphur scientific review effort. The first draft of this review will be completed September 1995.

CEPA/FPAC supports the plans to review the current three-tiered air quality objectives framework and develop protocols for the development of air quality objectives.

The next meeting of the Working Group on Air Quality Objectives and Guidelines will be held in October 1995, in Victoria.

State of the Environment

Canadians need credible, timely and comprehensive information on environmental trends and conditions if they are to make informed choices leading toward sustainable development. For that reason, the federal government reports periodically to Canadians on the state of the environment (SOE). In its reports, the Government relates environmental information to social and economic considerations.

Environment Canada's State of the Environment Directorate (SOED), in accordance with CEPA's legislative mandate, is working to:

- ▶ publish a national report on the state of Canada's environment at regular intervals; and
- ▶ develop and release a comprehensive set of national environmental indicators on a regular basis.

Reporting

The State of Canada's Environment, Canada's second national SOE report was released in April 1992. Prepared over a four-year period with substantial contributions from a broad range of stakeholders, the report has become a Canadian best-seller. To date, approximately 17,000 copies have been sold. An extensive evaluation of the report revealed that 93% of respondents felt that the Report met their expectations and needs. Drawing on the results of this evaluation, the SOE organization developed a strategic plan for development of the next national SOE report, to be released in 1996. It also established SOE networks and coordinating committees to permit a wide range of stakeholders to participate in the preparation process. Work on chapter manuscripts began in 1993-94.

Ecological Monitoring and Assessment

Business plans have now been developed for five Ecological Science Co-operatives (ESCs) comprising some 30 individual sites. The five ESCs are Atlantic Maritime, Boreal Shield, High Arctic, Northern Yukon, and Pacific Maritime. Work is proceeding actively to complete the Ecological Monitoring and Assessment Network which is formed of the ESCs. The Network was established in 1994 and held its first meeting of active and potential ESC participants in January 1995.

Environmental Indicators

Canada uses bulletins to report regularly on a national set of environmental indicators. Six indicator bulletins were published in 1994-95: *Energy Consumption*; *Climate Change*; *Sustaining Marine Resources: Pacific Herring Fish Stocks*; *Stratospheric Ozone Depletion (Fall 1994 update)*; *Energy Consumption (Winter 1995 update)*; and *Climate Change (Winter 1995 update)*.

The Department continued indicator research and development in the following areas: acid rain, urban green spaces and land-use change, marine fish resources and marine ecosystem health, forest resources, agricultural soil resources, biodiversity and state of wildlife, toxic contaminants in the ecosystem, and waste management.

Effort is increasingly being focused on the links between environmental indicators and social and economic indicators in a sustainable development context. Environment Canada, in cooperation with the B.C. Ministry of the Environment, the University of Victoria's Institute on Sustainable Regional Development has begun a project to develop a conceptual and operational framework for indicators of sustainability. Phase 2 of the project will test the application of the potential sustainability indicators in the Fraser River Basin.

Consultations and partnerships with stakeholders remain an integral part of the indicators program. Stakeholders are being invited to review and comment on proposed indicators during the development process. Extensive stakeholder involvement is essential to having indicators accepted and used as "common currency". Work with the provinces and territories through the Canadian Council of Ministers of the Environment (CCME) resulted in the identification of a core set of environmental indicators focused on five CCME priority areas: hazardous waste; contaminated sites; solid waste management; air issues; and water quality and water use efficiency. The application of these identified indicators will be tested, using British Columbia as a pilot province.

During 1994-95, SOED coordinated Canada's input and advice to the United Nations Commission on Sustainable Development (UNCSD's) initiative on sustainable development indicators, and participated in the Indicators working Group under the North American Environment Information Initiative.

Ecological Framework

The ecozone concept continues to be a useful concept to discuss the environmental issues which affect Canada. Numerous federal, provincial and private environmental groups have published and used their own specific subsets of the national ecological framework. The *Ecoregions of Saskatchewan* report is an example. The federal departments of Forestry and Agriculture have been very cooperative in further integrating specific types of environmental information concerning issues related to vital renewable resource sectors. Statistics Canada has been further integrating human activity data and expanding the socioeconomic dimensions of the ecosystem classification. The National Conservation Area Data uses the framework to assess ecosystem biodiversity.

Acceptance of this framework continues to grow. The framework is serving as a common protocol to promote the sharing of information and expertise between agencies. Most jurisdictions acknowledge that they are faced with an increasing number of similar administrative needs. Cross border cooperation and consensus building is virtually a necessity for successful business and conservation plans. The application of the framework is helping greatly to build a better understanding of how to assess the

ecological sustainability of Canada's resources, regardless of jurisdictional barriers. The highly integrative basis of this information is encouraging the application of an ecosystem approach and the evaluation of concerns from a broader perspective of interest groups.

Under the Tri-lateral Committee on Environmental Information, this work has been extended to cover Canada, the United States, and Mexico. The North American Commission on Environmental Cooperation has also considered this type of framework to be crucial for reporting on the continental state of the environment.

Environmental Information Network

Environment Canada is developing the **Green Lane**, an environmental information domain within the Internet (<http://www.doe.ca/envhome.html>) intended to help Canadians to make sound decisions and take action about environmental issues and sustainable development. Anyone in the world that has access to Internet may access the **Green Lane**. The **Green Lane** comprises various sub-domains of information (products, services, regions, etc.) supporting Environment Canada's business lines. It is regarded as a cost-effective approach to the dissemination of information to a large and growing audience, nationally and internationally. The **Green Lane** provides interactive access to Environment Canada services, products, information holdings, programs and policies. It is a road map to environmental information and knowledge found within Environment Canada, across Canada and throughout the world.

The **Green Lane** is comprised of eight WWW (World Wide Web) servers located in Environment Canada's regional offices. There is a server in each of the following cities: Halifax, Montreal, Hull, Toronto, Burlington, Winnipeg, Edmonton and Vancouver.

There are six major Environment Canada home pages: the departmental home page, and five regional home pages: Atlantic, Quebec, Ontario, Prairie and Northern, and Pacific and Yukon. In general, national information is made available through the departmental home page, and regional information is made available through the regional home pages. There are links that allow navigation among all the home pages as well as links to other sources of environmental information. Some of the home pages provide keyword searching.

Non-regulatory Instruments

CEPA Part I and Part IV gives the federal government responsibility for a wide range of non-regulatory actions.

Researchers are devoting considerable effort to developing guidelines and codes of practice to give industries and regulators clear directions on how to reduce emissions, effluents and wastes.

Recently developed non-regulatory instruments include

- ▶ Glycol Guidelines; and
- ▶ Technical Guidelines for Federal Underground Storage Tanks

Environmental Quality Guidelines

The Minister of the Environment has the legislative mandate and authority to formulate environmental quality guidelines and objectives under Part 1 Section 8 of CEPA. Federal, provincial and territorial agencies use these non-regulatory, scientifically-established tools for assessing and managing environmental quality issues.

In 1994-95, Environment Canada, in conjunction with the CCME, published water quality guidelines for the following substances: chlorothalonil and methylchlorophenoxyacetic acid (MCPA). Linuron and tebuthiuron are currently in press. Ethylbenzene, toluene, dioxins and furans, and PAHs are now in final review stages by the national Task Group. Guidelines for cadmium and for plant biomass in running water are at review stages. Water quality guideline development for chlorobenzenes, ammonia, chlorine/chloramines, benzene, arsenic, antimony, fluorides, carbaryl, bromacil, chlorpyrifos, and

deltamethrin has been initiated. Continued harmonization efforts between Environment Canada and the provinces and territories are underway in water quality guideline development.

The Derivation of Canadian Tissue Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Life is in review. Tissue residue guidelines for dioxins and furans, arsenic, and cadmium are being developed. Tissue residue guidelines for DDT, PCBs, and toxaphene are also underway.

The Protocol for the Derivation of Canadian Sediment Quality Guidelines for the Protection of Aquatic Life has been published. Sediment quality guidelines for cadmium and mercury are in review. Draft guidelines are being developed for 13 PAHs, and total PCBs. Sediment quality guideline development has been initiated for arsenic, zinc, copper and lead. There are assessments underway for PCBs, DDT and toxaphene as well as dioxins and furans.

Environment Canada has also been involved in a collaborative effort with the National Water Research Institute to develop a Spiked Sediment Toxicity Bioassay Methodology. This data will contribute to the information base on the toxicity of chemicals in sediments to associated biological organisms.

The Canadian Sediment Quality Guidelines are proposed for use as screening levels in assessing dredged sediments in the Ocean Disposal Program. Public consultation on this evaluative process has been underway as part of the Ocean Disposal Program's regulatory revisions under CEPA Part VI.

Environment Canada and the CCME have developed a *National Protocol for the Development of Soil Quality Guidelines* which is currently in press. The *Environmental Risk Assessment (ERA)* document is also in publications along with supporting national guidance documents. Two other reports, *Guidance Manual on Site Specific Objectives* and *Application of Whole Organism Bioassays*, have recently been approved for publication by the Advisory Group of the CCME. Other national soil quality guidelines currently under final review are cadmium, copper, mercury, and lead. Documents currently under review by the CCME Advisory Group are for: arsenic, vanadium, benzo(a)pyrene (BaP), pentachlorophenols, (PCPs), phenol, toluene, xylene, ethylbenzene, ethylene glycol, tetrachloroethylene and zinc. Soil quality guideline development has also been initiated for chromium, cyanide and naphthalene.

Environment Canada and the CCME have also produced *A Framework for Developing Goals, Objectives and Indicators of Ecosystem Health: Tools for Ecosystem-Based Management*, which is currently in press. The document provides guidance on: (1) the acquisition of a common knowledge base, (2) the establishment of ecosystem health goals and objectives which incorporate stakeholder views and societal values, (3) the development or selection of ecosystem health indicators, (4) the conduct of directed research and monitoring to augment the knowledge base, and (5) the assessment of the effectiveness of the decisions on the health of the ecosystem.

The Environmental Choice Program

The Environmental Choice[™] Program (ECP), Canada's voluntary ecolabelling program, helps consumers identify products and services that significantly reduce the burden on the environment. The EcoLogo[™], three doves intertwined to form a maple leaf symbolizing Canadian government, business and consumers working together for the environment, identifies products and services which meet the ECP's stringent environmental criteria.



The ECP is cooperating internationally with numerous other countries that are establishing comparable labeling programs. In Canada, the EcoLogo is being well received in the marketplace and generating increasing interest from both consumers and industry. Based on ECP's achieved credibility, increasing interest is also being shown by private and public sector procurement officials in the ECP's established environmental criteria for various products and services.

Protected under the *Trade Marks Act*, the "Environmental Choice" and "EcoLogo" word marks and the EcoLogo symbol are official marks of Environment Canada. They may be used only under license or through authorization from the Program.

Between April 1994 and March 1995, considerable effort has been made in reviewing and revising product-specific environmental criteria contained in existing ECP guidelines to improve relevancy

(i.e. reflect technological and market conditions and changes). Concurrently, work has continued on the development of new guidelines to supplement existing ones in the following areas:

- ▶ residential sector and home care;
- ▶ cleaning products and services;
- ▶ office and school products and services;
- ▶ paper products;
- ▶ automotive products and services;
- ▶ personal care products.

This work will result in the establishment of a critical mass of approximately 70 significant product and service guidelines by 1996 which will greatly increase the number and variety of ECP-certified products and services.

A complementary "panel review" process for the establishment of environmental criteria for certification has also been developed. It enables the ECP to consider the environmental attributes and relative merits of products and services for which guidelines have not been, and are not expected to be, developed. This process will be operationalized in May 1995.

CEPA Part II: Toxic Substances

Part II of CEPA focuses on reducing the risks posed by new and existing substances. In order to distinguish new substances from existing ones and to prescribe reporting requirements for new substances, Environment Canada has developed two major inventories:

- ▶ the Domestic Substances List, an inventory of all chemicals known to be in use in Canada during 1984-86; and
- ▶ the Non-domestic Substances List, an inventory of substances not in use in Canada from 1984-86 but used elsewhere.

Part II of CEPA also requires the establishment of the Priority Substances List (PSL), a list of substances considered most important for assessment.

The Priority Substances List

The first Priority Substances List (PSL) was published in February 1989 by the Ministers of the Environment and of Health. The assessment of these substances to determine whether or not they are toxic or capable of becoming toxic, as defined under section 11 of CEPA, was completed within the five year time frame.

According to CEPA, a substance is toxic if it is entering or may enter the environment in a quantity, or concentration, or under conditions

- ▶ having or that may have an immediate or long-term harmful effect on the environment;
- ▶ constituting or that may constitute a danger to the environment on which human life depends; or
- ▶ constituting or that may constitute a danger in Canada to human life or health.

A new PSL is under preparation.

The Priority Substances List II

In 1994, following extensive consultation, Environment Canada and Health Canada published a revised proposal for developing PSL II using an open, science-based process to select substances. The proposal suggested a process for substance nomination, criteria for screening candidate substances, and considerations for a Ministerial Expert Advisory Panel that would recommend a new list.

In December 1994 the Ministers of Environment and of Health appointed the Expert Advisory Panel for PSL II. The multi-stakeholder Panel represents labour, health and environmental groups, academia, industry and the provincial, territorial and federal governments. The Panel held two meetings in 1995. Panel members have developed networks within their constituencies to advise them on substance nominations and other related issues. Two additional Panel meetings have been scheduled and the Panel's aim is to provide the Ministers with its final recommendation by the end of September 1995.

Under the Priority Substances Assessment Program, the Government is developing a guidance manual to provide evaluators with a consistent approach for assessing the ecological risks of substances on PSL II. The manual will address the most recent scientific advances in the field of ecological risk assessment and is being developed in consultation with other government departments, industry representatives and scientific experts and stakeholders from outside the program. A multi-stakeholder workshop was held in January 1995 that led to the resolution of some critical scientific issues. An initial draft of the manual is scheduled to be completed in July 1995. The guidance manual is expected to be finalized by November 1995.

Collecting Information

Sections 15 through 18 of CEPA allow the federal government to collect data and samples concerning the production, application and importation of substances.

National Pollutant Release Inventory

In 1994 Environment Canada received and compiled reports filed with the National Pollutant Release Inventory (NPRI) by 1,466 facilities across Canada. For 1993, the first reporting year for the NPRI, a total of 5,248 substance reports were filed and overall releases were 227,683 tonnes. Facilities had until June 1, 1994 to file their reports with Environment Canada.

The National Pollutant Release Inventory published its first annual summary report in March 1995. The annual summary reflects 1993 releases and transfers. The information is available on Internet at <http://www.doe.ca/pdb/npri.html>

On February 26, 1994, a notice was published in the *Canada Gazette* requiring facilities to report their releases and transfers in waste for the 1994 reporting year, the second reporting year for the NPRI. This information will also be made public through the publication of an annual summary in early 1996 and through Internet access.

A notice was published on February 18, 1995 in the *Canada Gazette* requiring facilities to report for 1995. A change was made to the reporting criteria used in previous years so that facilities that release large quantities at low concentrations would be required to report. Changes were also made to the list of substances in order to better capture substances of concern.

Confidentiality Requests

In some circumstances, a person may submit a written request for confidentiality when providing information on toxic substances (section 19). Section 20 provides for the non-disclosure of information that has been submitted with a request for confidentiality. Such requests are subject to certain terms and conditions.

Disclosing Information

Information collected under CEPA may be disclosed if it consists of

- ▶ general data on uses of a substance;
- ▶ occupational exposure studies;
- ▶ recommended methods for disposal and elimination of a substance;
- ▶ toxicological, clinical and ecological studies of a substance;
- ▶ safe handling precautions;
- ▶ physical and chemical data that do not reveal the identity of a substance;
- ▶ safety measures to be taken in case of accidents involving a substance;

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- ▶ health and safety data;
 - ▶ tests performed under CEPA; or
 - ▶ test methods and results of product or environmental testing when carried out by, or on behalf of, a government institution, unless it was done for a fee as a service to other than a federal government institution.

In 1994/95 Environment Canada received 20 requests pursuant to the *Access to Information Act* for information related to CEPA. Requests were received on the following subjects:

- ▶ PCB storage sites in Quebec;
- ▶ Pulp and Paper Effluent Chlorinated Dioxin and Furan Regulations;
- ▶ Quebec/Canada Administrative agreement under s. 98 of CEPA;
- ▶ Federal Mobile PCB Treatment and Destruction Regulations (SOR/90-5);
- ▶ PCB Waste Export Regulations (SOR/90-453);
- ▶ Treatment and disposal of hazardous waste on federal lands; and
- ▶ Environmental compliance of properties.

Environment Canada released in whole or in part in seven requests with documents being excluded in one request. The requested information did not exist in eight requests and one request was abandoned. The department treated two requests informally.

Environmental Compliance Requests

Of the 20 CEPA related requests received in 1994/95, 12 concerned the environmental compliance status of properties. Compliance with respect to CEPA, and all other Acts administered by Environment Canada was included in the search. Information did not exist in eight requests, documents were located in three requests and one request was abandoned.

National Pollutant Release Inventory

More than 130 companies indicated that the information that they were providing to the 1993 NPRI was confidential.

As permitted under paragraph 20(2)(a) of CEPA [information may be disclosed if it consists of general data on uses of a substance] and section 20(3) of CEPA [Environment Canada can deal with a request under the *Access to Information Act*], the companies which claimed confidentiality were asked to support their claim for confidentiality using criteria in section 20 of the *Access to Information Act*.

Of the 43 responses received, 26 reconsidered their position and consented to disclosure, 17 requested confidentiality.

Four claims of confidentiality were accepted; the remainder were rejected and the companies were advised of their right to a review of this decision by the Federal Court of Canada. One company filed an application pursuant to section 44 of the *Access to Information Act* with the Federal Court of Canada.

The Domestic Substances List

The Domestic Substances List is an inventory of more than 21,000 substances manufactured in or imported into Canada on a commercial scale between 1984 and 1986. Environment Canada published the first list in the January 1991 edition of the *Canada Gazette Part I*. In May 1994, it published a revised list in the *Canada Gazette Part II*, incorporating deletions, additions and corrections to the 1991 publication. Another amendment for the Domestic Substances List is scheduled for the Fall of 1995.

Environment Canada uses the Domestic Substances List as its sole basis for determining whether a substance is "new" to Canada. It relies on the list when deciding whether substances require notification or assessment before they are manufactured in Canada or are imported into the country. Substances on this list are exempt from CEPA's New Substances provisions, as they are considered to be "in use" in Canada. However,

existing substances that could cause adverse environmental or health effects could be nominated for Priority Substances List assessments.

Environment Canada has developed eligibility criteria for incorporation of living organisms on the Domestic Substances List and, together with Health Canada and the affected industry, has established naming rules for incorporation of biochemicals and biopolymers on the Domestic Substances List. Environment Canada is advising Canadian manufacturers and importers of these developments and will request nominations of micro-organisms and products of organisms such as enzymes for entry on the Domestic Substances List. A provisional list of micro-organisms and products of organisms nominated for inclusion on the Domestic Substances List is under review and a final list will be published in fall 1995.

The Non-domestic Substances List

There are 41,000 substances on the Non-domestic Substances List known to be commercially available around the world, but not on the Canadian market.

This list recognizes substances that are not on the Domestic Substances List but are not new to world commerce. The Government requires less detailed information about these substances than about substances new to Canada.

Environment Canada chose the United States' 1985 Toxic Substances Control Act Inventory as a basis for this list. It deleted all substances on Canada's Domestic Substances List from the non-confidential portion of the U.S. inventory to produce the Non-domestic Substances List.

The list appeared, along with the Domestic Substances List, in the *Canada Gazette Part I* on January 26, 1991. Environment Canada is currently updating the Non-domestic Substances List from the Toxic Substances Control Act Inventory additions of 1985 to 1990. Revisions to the Non-domestic Substances List are expected to be published in the *Canada Gazette* in fall 1995.

New Substances

Notification and assessment is required before substances not on the Domestic Substances List can be manufactured in or imported into Canada. The New Substances Notification Regulations prescribe the information required from manufacturers and importers for this notification.

New Substances Notification Regulations: Chemicals and Polymers

The New Substances Notification Regulations for chemicals and polymers were published in the *Canada Gazette Part II* in April 1994 and came into effect July 1, 1994.

The effective date of these regulations marked the beginning of CEPA's New Substances Notification Program. The regulations require manufacturers and importers to supply specified information on new commercial substances, including chemical identity; toxicological and environmental effects data; manufacturing, processing and use data; and the volumes proposed for manufacture and import. Substances on the Non-domestic Substances List, however, have fewer notification requirements than other new substances.

New substances are divided into categories, such as site-limited intermediates, export only, and research and development substances. The characteristics of each category and any anticipated concerns determine the nature of the information required about new substances. The Government may require additional information or testing, impose controls, or ban the manufacture or importation of a substance if it suspects the substance is toxic. The Departments of Environment and Health are currently reviewing 5,500 transitional substances and are expecting 500 new substances notification for 1995/1996.

New Substances Notification Regulations: Biotechnology

Draft new substance notification regulations for biotechnology products have been developed following multi-stakeholder consultations in December 1992, July 1993 and December 1994. The draft regulations address micro-organisms and plants and substances produced by organisms. A draft

Regulatory Impact Analysis Statement for the New Substance Notification Regulations dealing with biotechnology products has been prepared based on the assessment of the impacts associated with the regulations. The regulations form part of a package of regulatory amendments, developed by Environment Canada, Health Canada and Agriculture and Agri-Food Canada, that addresses the regulation of biotechnology substances and are collectively referred to as the "federal framework for regulating biotechnology". The draft regulations are targeted for publication in *Canada Gazette Part I* in fall 1995, and in *Canada Gazette Part II* in spring 1996. Regulations are proposed to come into effect in summer 1996.

Confidential Business Information

Regulations have been developed for confidential business information submissions and for masking chemical names published on the Domestic Substances List and the Non-domestic Substances List for reasons of confidentiality. The Masked Names Regulations were published in the *Canada Gazette Part II* on April 6, 1994.

Good Laboratory Practice

Environment Canada has formed a Good Laboratory Practice (GLP) Compliance Monitoring Unit in response to Organisation for Economic Co-operation and Development (OECD) Council decisions on the mutual acceptance of data and on GLP requirements for tests involving the health and safety evaluation of chemicals and requirements in the New Substances Notification Regulations of 1994. This Unit is inspecting domestic laboratories which supply test data for new substances notifications, determining the compliance status of foreign laboratories which supply similar data, and participating in ongoing OECD activities on the development and use of GLP in member countries.

During 1994, the Unit participated in: a workshop on GLP in Canada; an OECD training course for GLP inspectors; OECD working groups on the harmonization of inspection reports and on the application of GLP to computer systems; preparation of an Annex on GLP in a new Canadian Standards Association standard for environmental testing laboratories; and in bilateral discussions with the European Union and the US Food and Drug Administration on the mutual recognition of GLP programs. During 1995, work will continue on public consultation on the development of a Canadian GLP program, the development of international bilateral agreements on the mutual recognition of GLP programs, and an OECD initiative to update its *Principles of Good Laboratory Practice*.

Creating Regulations

Regulations can be developed under various parts of CEPA. Before they have the force of law, CEPA regulations pass through many stages to allow time for public comment and close examination of implications. For hazards requiring immediate action, however, the Government may issue interim orders and temporarily by-pass the public consultation system. Interim orders have the force and effect of regulations.

Regulations typically begin with an assessment report that establishes a scientific basis for control. The Government considers a number of options before pursuing regulations, but where regulations are the preferred course of action, draft versions are developed and sent to a Cabinet committee following public consultation.

Proposed regulations appear in the *Canada Gazette Part I* with a Regulatory Impact Analysis Statement (RIAS) summarizing the purpose of the regulations, alternatives, benefits and costs, consultation, and enforcement and compliance. Following a 60-day period set aside for public comment, the government finalizes the proposed regulations. After regulations are registered, they are in force and are published in the *Canada Gazette Part II*.

Throughout the decision-making process for all environmental protection initiatives, the government's approach to regulation takes socio-economic issues into account. This includes

- ▶ developing socio-economic background studies;
- ▶ assessing the effectiveness of alternative instruments for achieving environmental protection objectives; and

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- ▶ evaluating and quantifying the costs and benefits of the selected instruments.
- These considerations provide for more informed decision making and improve the quality of RIA'S.

Strategic Options Process

Consultative working groups were established to identify and evaluate options regarding the best way to address the problems caused by the substances declared toxic under CEPA. Stakeholders invited to participate in the consultations include other federal departments, provinces, industry and ENGOs.

Two approaches have been used to address the toxic substances:

- a) **Substance Approach:** when a substance is released to the environment during the use of a commercial product (ie: solvent "x" in paint, as an example); and
- b) **Sector Approach:** when a substance is released to the environment due to an industrial operation (benzene during steel manufacturing, for example).

During 1994-95, three substance and three sector working groups started their deliberations (PSL-1 table: Items #2 and #4). Original time lines, to deliver recommendations to Ministers of Environment and of Health, were expected to be between 12 and 18 months. These time lines were requested to be compressed as shown in the table.

During 1995-96, four sector working groups listed under Item #5 are expected to start their deliberations, with compressed time lines as shown.

For the purpose of accelerating the deliverables, Environment Canada will prepare control options reports for four additional substances (Item #3) without using the formal consultative process described above.

Five substances, listed in the table (Item #1), are directly regulated without the use of the formal consultative process described above. One of the substances, an ozone-depleting substance (ODS), will be phased-out under the Montreal Protocol with Bis(chloroethyl) ether and Bis(chloromethyl) methyl ether being phased-out as a preventative measure since they are not in Canadian use, production or commerce. Dioxins/furans from the pulp and paper sector will continue to be regulated under the existing framework.

The chlorinated municipal effluent compound of chlorinated wastewater effluents is now being addressed through a proposed strategy on municipal effluents.

PAHs and inorganic fluorides are mainly released from aluminum smelting operations. This sector is in majority located in the province of Quebec. The Quebec Ministry of Environment is currently in the process of amending its air regulations in a way that is expected to reduce the release of these two substances. Environment Canada is supporting Quebec's efforts in this domain.

Regulatory Review

In November 1994, Environment Canada released the *Regulatory Review Final Report*, in accordance with Treasury Board's government-wide review of regulations. The review covered 25 CEPA regulations. The final report includes Environment Canada's conclusions and recommendations of its review of regulations. Action plans for implementing the recommendations of the review of CEPA regulations are included in the final report.

**PSL-1 Toxic Substances: Follow-up
Compressed Schedule for Deliverables**

1 - DIRECT TO REGULATIONS

1,1,1-trichloroethane (1) ODS	Montreal Protocol	June 94
Bis(chloroethyl) ether (6)	Preventive regulations	Aug. 95
Bis(chloromethyl) methyl ether (7)	Preventive regulations	Aug. 95
Dioxins (12)	Pulp and Paper regulations	Dec. 92
Furans (15)	Pulp and Paper regulations	Dec. 92

ODS = (Ozone-depleting Substance)

2 - SUBSTANCE SOPs (Workplan 94/95)

benzidine / 3,3'-dichlorobenzidine (5,3)	Oct. 95
refractory ceramic fibres (23)	Feb. 96
chlorinated paraffins (8)	July 96

3 - SUBSTANCE (Workplan 95/96)

1,2-dichloroethane (2)	Aug. 96
dichloromethane (11)	Aug. 96
ethylhexyl phthalate (14)	Aug. 96
hexachlorobenzene (16)	Aug. 96

4 - SECTOR SOPs (Workplan 94/95)

Dry Cleaning (24)	Feb. 96
Solvent Degreasing (24,25)	Apr. 96
Wood Preservation (10,12,16,17,18,22)	Aug. 96

5 - SECTOR SOPs (Workplan 95/96)

Iron and Steel (4,12,17,18,19,20,21,22)	Jul. 96
Metal Finishing (17,19,21)	Oct. 96
Base Metal Smelting (18,19,21)	Dec. 96
Electric Power Generation (17,18,19,20,21)	Dec. 96

TOXIC SUBSTANCES FROM PSL 1

1. 1,1,1-trichloroethane
2. 1,2-dichloroethane
3. 3,3'-dichlorobenzidine
4. Benzene
5. Benzidine
6. bis(chloroethyl) ether
7. bis chloromethyl methyl ether
8. Chlorinated paraffins
9. Chlorinated wastewater effluents
10. Creosote impregnated wastes
11. Dichloromethane
12. Dioxins
13. Effluents from pulp & paper using bleach
14. Ethylhexyl phthalate
15. Furans
16. Hexachlorobenzene
17. Hexavalent chromium compounds
18. Inorganic arsenic compounds
19. Inorganic cadmium compounds
20. Inorganic fluorides
21. Oxidic, sulphidic, soluble inorganic nickel compounds
22. PAHs
23. Refractory ceramic fibres
24. Tetrachloroethylene
25. Trichloroethylene

Recently Developed Regulations and Amendments

Thirty-two regulations, which include amendments, are currently in place under CEPA. Over the past year, the department brought eight new and/or amended regulations into force and continued work on several other regulatory initiatives. The Government also introduced an Omnibus Amendment Order during the year. It allows departments to make minor, non-contentious amendments with no policy implications through a streamlined process. Through the use of this Order, amendments to five other regulations were made.

CEPA Regulations and Amendments

Regulation	Publication in <i>Canada Gazette Part II</i>
New Substances Notification Regulation, Amendment	December 1994
Ozone-depleting Substances Regulations, Amendments	December 1994 (methyl bromide)
Export and Import of Hazardous Wastes Regulations, Amendments	July 1994
Gasoline Regulations Amendment	June 1994
Ozone-depleting Substances Regulations	June 1994
Ozone-depleting Substances Products Regulations	June 1994 (amended OD Regulations No.3)
New Substances Notification Regulations	
▶ Part I - New substances other than biotechnology products or polymers	April 1994
▶ Part II - Polymers	April 1994
Masked Name Regulations	April 1994
Ocean Dumping Regulations, 1988 Amendment	September 1993
Export and Import of Hazardous Wastes Regulations	December 1992
Toxic Substances Export Notification Regulations	December 1992
Vinyl Chloride Release Regulations (revision)	December 1992
Pulp and Paper Mill Defoamer and Wood Chip Regulations	May 1992
Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations	May 1992
Storage of PCB Material Regulations	May 1992
Contaminated Fuels Regulations	August 1991
Chlorobiphenyls Regulations	March 1991
Secondary Lead Smelter Release Regulations	March 1991
Ozone-depleting Substances Regulations No. 3 (prohibit certain uses of CFCs)	September 1990
PCB Waste Export Regulations	August 1990
Asbestos Mines and Mills Release Regulations	July 1990
Gasoline Regulations	May 1990
Chlor-Alkali Mercury Release Regulations	February 1990
Mirex Regulations	February 1990
Polychlorinated Terphenyl Regulations	February 1990
Chlorofluorocarbon Regulations	February 1990
Polybrominated Biphenyl Regulations	February 1990
Federal Mobile PCB Treatment and Destruction Regulations	January 1990
Phosphorus Concentration Regulations	November 1989
Ocean Dumping Regulations	November 1989
Fuels Information Regulations No. 1	August 1977

Note: In addition, there have been a number of minor modifications to CEPA regulations which have been dealt with through the Omnibus Amendment Order.

CEPA Omnibus Amendment Order, 1993

The Omnibus Amendment Order allows departments to clean up various regulations requiring minor changes or corrections without following the normal lengthy regulatory process. Under the Omnibus Amendment Order published in the *Canada Gazette Part II* in June 15, 1994, the following regulations under CEPA were amended:

- ▶ Asbestos Mines and Mills Release Regulations;
- ▶ Chlor-Alkali Mercury Release Regulations;
- ▶ PCB Waste Export Regulations;

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- ▶ Pulp and Paper Mill Defoamer and Wood Chip Regulations; and
 - ▶ Secondary Lead Smelter Release Regulations.

CEPA New Substances Notification Regulations

The CEPA New Substances Notification Regulations were published in *Canada Gazette Part II* on April 6, 1994 and came into effect on July 1, 1994. These regulations will ensure that new chemical and polymeric substances are thoroughly evaluated for potential adverse impacts on the Canadian environment and human health before any significant manufacture in or importation into Canada takes place. (See page 23 - *New Substances Notification Regulations: Chemicals and Polymers*).

Ozone-Depleting Substances Regulations

Regulations on Ozone-depleting Substances

Canada, as a party to the Montreal Protocol on Substances that Deplete the Ozone Layer, must take the necessary measures to implement the requirements of this international treaty. In some cases, the Canadian government is also committed to supplementary domestic measures.

In 1994, Environment Canada published two regulations under CEPA to fulfil its international and domestic commitments.

The Ozone-depleting Substances Regulations came in force on June 2, 1994. These regulations control the import, manufacture and export of ozone-depleting substances. Among other things, they establish the phase-out dates for the manufacture and import of new halons (July 1, 1994), carbon tetrachloride (January 1, 1995) and CFCs and methyl chloroform (January 1, 1996). In addition, these regulations prohibit the use or sale of an ozone-depleting substance that would have been illegally imported or manufactured after its phase-out date.

The Ozone-depleting Substances Regulations also establish requirements for obtaining permits for the import and export of used, recovered, recycled and reclaimed ozone-depleting substances.

These regulations were amended on December 6, 1994 to include controls on methyl bromide. Starting on January 1, 1995, methyl bromide imports were frozen to 1991 level. The amendments also require a 25 percent reduction of methyl bromide imports by 1998.

The Ozone-depleting Substances Products Regulations which had been promulgated on August 28, 1990 (as Ozone-depleting Substances Regulations No. 3) were amended on June 2, 1994. These regulations prohibit the manufacture, import, sale and offer for sale of pressurized containers that contains 10 kilograms or less of CFCs. Products which are affected by this prohibition include cans of refrigerant (less than 10 kilograms). They also prohibit the importation of certain products containing ozone-depleting substances from countries that are not Parties to the Montreal Protocol.

Domestic Regulations to Support International Commitments

Environment Canada, authorized by CEPA, regulates the production, import and export of ozone-depleting substances, including CFCs, halons, methyl chloroform, carbon tetrachloride, hydrobromofluorocarbons (HBFCs) and methyl bromide, as well as certain products containing CFCs.

The federal government is amending its regulations to reflect its current domestic and international commitments. The following is a short description of the current contents of these regulations.

Ozone-Depleting Substances Regulations

The amalgamated and amended Ozone-depleting Substances Regulations came into force in June 1994. They were amended in December 1994 to include methyl bromide. These regulations control the import, manufacture, use, sale and export of bulk ozone-depleting substances. They reflect the commitments Canada has made regarding production and consumption of ozone-depleting substances. Note that consumption is equal to the amount of a substance produced domestically plus the amount imported, less the amount exported.

Canada has made the following commitments:

- ▶ *CFCs:*
 - 75 percent reduction by January 1, 1994
 - 100 percent elimination by January 1, 1996
- ▶ *halons:*
 - 100 percent elimination by January 1, 1994
- ▶ *carbon tetrachloride:*
 - 100 percent elimination by January 1, 1995
- ▶ *methyl chloroform:*
 - 50 percent reduction by January 1, 1994
 - 85 percent reduction by January 1, 1995
 - 100 percent elimination by January 1, 1996
- ▶ *hydrobromofluorocarbons (HBFCs):*
 - 100 percent elimination by January 1, 1996
- ▶ *methyl bromide:*
 - freeze at 1991 level by January 1, 1995
 - 25 percent reduction by January 1, 1998

These regulations prohibit the use or sale of a controlled substance that was illegally imported or manufactured after its phase-out date. They also establish requirements for obtaining permits for the import and export of used, recovered, recycled and reclaimed ozone-depleting substances.

Ozone-depleting Substances Products Regulations

The Ozone-depleting Substances Regulations No. 3 (Products) were amended and became the Ozone-depleting Substances Products Regulations in June 1994. These regulations prohibit the manufacture, import, sale and offer for sale of

- ▶ plastic foam packaging material or containers in which any CFC has been used as a foaming agent; and
- ▶ pressurized containers that contain 10 kilograms or less of CFCs. Products affected by this prohibition include aerosols, cans of refrigerant (less than 10 kilograms), novelty products and fog horns.

Health care products are exempted from these regulations. The regulations also prohibit the import of certain products containing ozone-depleting substances from non-parties to the Montreal Protocol as required by the Protocol.

The development of strategic options reports for HCFCs was completed in February 1995. Consultations on control options took place in October 1994 and February 1995 for HCFCs. Amendments to incorporate controls on HCFCs into the existing regulations are being prepared.

Release of Toxic Substances

Sections 36 through 38 of CEPA address the dangers posed by the release of toxic substances into the ecosystem. CEPA provides for reporting and precautionary measures, including the notification of inspectors and of any member of the public who may be adversely affected by the impending threat.

Recovery of Reasonable Costs

When the Department must step in to control the release of toxic substances, CEPA makes provisions for the recovery of costs. Under sections 39, 60 and 77, when polluters fail to take preventive measures to correct their contravention of a CEPA regulation or interim order, the federal government may take action and reclaim expenses. In 1994-95, Environment Canada was not required to invoke these sections.

Export and Import of Hazardous Wastes

According to section 43 of CEPA, "hazardous waste" is a waste dangerous good within the meaning of the *Transportation of Dangerous Goods Act* and Regulations, or any substance included on Environment Canada's list of hazardous wastes requiring an export or import notification. This section gives the Minister of the Environment authority to:

- ▶ determine which hazardous wastes require import and export notification;
- ▶ decide which hazardous waste authorities importers and exporters must notify; and
- ▶ regulate the contents of the notification and conditions under which a person may import or export a hazardous waste.

The Export and Import of Hazardous Waste Regulations (EIHWR) pursuant to sections 43 to 45 of CEPA came into force in November 1992. They regulate the transboundary movement of hazardous wastes, destined for disposal or recycling, in and out of Canada. They also allow Canada to meet its international obligations to control the transboundary movement of hazardous wastes.

An amendment to these regulations was published in the *Canada Gazette Part II* on July 13, 1994. Among other changes, the amendment allows the electronic transmission of the notification of import through an electronic data interchange (EDI) system.

Environment Canada and Revenue Canada (Customs) have a Memorandum of Understanding for the implementation of the EIHWR. In 1994, Customs put into place procedures to be used by custom officers dealing with the import and export of hazardous wastes.

During 1994, a study was undertaken to review the needs of the Hazardous Waste Management Division (HWMD), and to develop a plan that will allow for the implementation of various information management systems (both computerized and manual) currently used for tracking and controlling transboundary movements of hazardous wastes, under the EIHWR. This plan is to provide the flexibility to allow the incorporation of new developments in information management technology and to identify a long range vision of information management within HWMD to better implement the EIHWR. The recommendation for a new client-server system is being implemented. The computerized hazardous waste tracking system is expected to be in full operation by the end of 1997. In the meantime, the existing computerized database has been upgraded to include operating features required to accommodate new needs.

The Basel Convention

When the Export and Import of Hazardous Waste Regulations were introduced in Canada in November 1992, the Basel Convention on the Transboundary Movements of Hazardous Wastes and their Disposal came into force in this country. The Convention aims to:

- ▶ ensure the prior informed consent of the receiving country prior to shipment;
- ▶ ensure that hazardous waste is disposed of in the country of generation, wherever possible;
- ▶ prohibit export of hazardous waste to countries lacking the legal, administrative and technical capacity to manage and dispose of it safely;
- ▶ forbid exports to countries that have banned the imports; and
- ▶ promote technology transfer, information exchange and harmonized standards, guidelines and codes.

The Basel Convention also supports the continued application of bilateral and multilateral agreements that promote environmentally sound management of hazardous wastes. Canada is party to two such agreements: the Canada-United States Agreement on the Transboundary Movement of Hazardous Wastes, which governs Canadian hazardous waste shipments to and from the United States, and the Organization for Economic Cooperation and Development (OECD) Council Act concerning the control of transfrontier movements of wastes destined for recycling operations.

In March 1994, Canada attended the second meeting of the parties to the Basel Convention. This meeting resulted in 28 decisions. One decision called for a ban on the export of hazardous wastes for final disposal from OECD countries to non-OECD countries. It also calls for a phase-out of such exports destined for recycling/recovery operations by December 31, 1997.

Timetable of Planned Regulations

Regulatory Initiative and Expected Year of Publication in Canada Gazette Part II

1995-96

Environmental Protection Boards of Review Rules
New Substances Notification Regulations, Part III - Biotechnology Products

Ozone-depleting Substances Regulations - Amendments (hydrochlorofluorocarbons)
Ozone-depleting Substances Products Regulations - Amendments
PCB Regulations, Amendments
CEPA Omnibus Amendment Order, 1994-1'
▶ Chlorofluorocarbon Regulations, 1989
▶ Vinyl Chloride Release Regulations, 1992
▶ Storage of PCB Material Regulations, 1992
▶ Masked Name Regulations
▶ Gasoline Regulations Amendments
Prohibited Substances Regulations
Fuels Information Regulation No. 1, Amendment
Confidential Information Regulations

1996-97

Ocean Dumping Regulations, Amendments - Phase II
Hazardous Waste Management at Federal Facilities
Dehydrator Emissions Regulations
PCB Regulations - consolidation
Ocean Dumping Regulation Amendment (London Convention)
Registration of Storage Tank Regulations
Ozone-depleting Substances
▶ Amendments to control Hydrochlorofluorocarbons
▶ Control of Hydrofluorocarbons

Unscheduled

Secondary Lead Smelter Release Regulations, Amendments
Good Laboratory Practice Regulations
Release Reporting Regulations
Air Emissions Guidelines/Regulations for Boilers at Federal Facilities
Asbestos Mines and Mills Release Regulations, Amendments

CEPA Part III: Nutrients

Sections 49 to 51 of CEPA define and help to regulate cleaning agents and water conditioners. Inspections continued under the Phosphorous Concentration Regulations.

CEPA Part IV: Controls on Government Organizations

Under Part IV of CEPA, the Minister of the Environment has the authority to regulate waste handling and disposal practices and emissions and effluents from federal department, Crown corporation and federal agency activities. It also gives the Minister the authority to make regulations and guidelines that apply to federal lands, works and undertakings where there is no express authority under the Act of Parliament governing that land, work or undertaking, to make regulations to protect the environment.

During fiscal year 1994-95, action on the following initiatives directed at the federal government took place:

- ▶ glycol guidelines for de-icing practices at federal airports were created under section 53 of CEPA;
- ▶ a code of good practice for the handling, storage, use and disposal of pesticides at federal facilities was published;
- ▶ *Guidelines for Environmental Auditing: Statement of Principles and General Practices* were published as a national standard using the Canadian Standards Association's multi-stakeholder process;
- ▶ an environmental issues workshop was held to provide federal employees with environmental information and training opportunities; and
- ▶ an interdepartmental steering committee on environmental issues for the federal sector was created to provide coordinated strategic direction on key policy and process issues.

The Federal Code of Environmental Stewardship

This 1992 initiative commits federal government departments to conform to the requirements of CEPA and other federal environmental legislation, and to make their operations compatible with other levels of government where appropriate. The majority of federal departments are developing environmental action plans.

In support of environmental stewardship, the following initiatives were undertaken:

- ▶ non-hazardous solid waste incinerators at federal facilities;
- ▶ spill reporting;
- ▶ contingency planning at federal activities;
- ▶ draft national guidelines on landfill operations on federal lands and at federal facilities;
- ▶ wastewater management on federal lands and at federal facilities;
- ▶ criteria for green procurement;
- ▶ waste management at federal facilities; and
- ▶ guide to green construction and renovation.

CEPA Part V: International Air Pollution

CEPA Part V gives the Minister of the Environment authority to regulate domestic sources of pollution that create air pollution in other countries or violate international agreements or threaten to do either. The Minister can exercise the authority only if the provinces are unable or unwilling to control pollution sources. To date, such action has not been necessary.

The federal, provincial and territorial governments have signed a Comprehensive Air Quality Management Framework For Canada. The framework establishes a cooperative mechanism to coordinate government action on air quality issues. Under the framework, the federal government has agreed to ask the provinces and territories for advice when developing and negotiating international air quality commitments and agreements.

Sulphur Dioxide Protocols

Canada has signed two protocols for managing sulphur dioxide (SO₂) emissions under the United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution (LRTAP).

The first, signed in 1985, committed Canada to reduce national emissions of SO₂ by 30% from the 1980 level by 1993 thereby creating a national cap on SO₂ emissions of 3.2 million tonnes beginning in 1993. The second, signed in 1994, will, if ratified, commit Canada to a cap on SO₂ emissions of 1.75 million tonnes beginning in year 2000 for a formally designated SO₂ Management Area (SOMA) encompassing about 1 million square kilometres in southeastern Canada. Canada has exceeded both of these commitments. In 1994, national SO₂ emissions had been reduced to 2.5 million tonnes, 40% below the 1980 national emission level of 4.6 million tonnes and 22% below the national cap, and emissions in the SOMA had been reduced to 1.2 million tonnes, 31% below the SOMA cap for year 2000. These results were achieved through negotiated bilateral agreements between the federal government and the seven easternmost provinces (all provinces east of the Manitoba-Saskatchewan border) on provincial emission caps for 1994. Provincial regulatory programs ensured the caps were achieved and stringent emission requirements placed on certain major new sources, e.g. natural gas plants, in some western provinces minimized growth in emissions.

NO_x and VOC Protocols

Reducing the level of pollutants that cause ground level ozone remains one of Canada's key environmental objectives. To this end, in 1988 Canada signed and ratified a UNECE protocol that calls for, among other things, a reduction of Canadian NO_x (nitrogen oxides) emissions sources to 1987 levels by 1994. This objective has been achieved. In addition, in 1991 Canada signed a UNECE protocol calling for a freeze in national VOC (volatile organic compound) emissions to 1988 levels by 1999. The federal government has also committed to reducing VOC emissions to 70 percent of 1988 levels by 1999 in selected emission management areas. Meeting these targets requires the full implementation of the NO_x/VOC Management Plan developed by federal, provincial and territorial governments. A review of the status of the plan has indicated that further action will be needed.

The Canada-United States Air Quality Agreement

The Canada-United States Air Quality Agreement was signed in 1991 in order to protect both countries from transboundary air pollution. The Agreement is an umbrella agreement to deal with all transboundary air pollution but currently contains commitments for only SO₂ and NO_x emissions aimed at reducing the acid rain problem. The Agreement also calls for cooperation in air emission inventory work, air quality monitoring, assessment of the state-of-environment related to transboundary air pollution, and research and development.

Specific commitments for Canada in the Agreement included reiteration of the 3.2 million tonne national SO₂ cap originally agreed to in the first UNECE Sulphur Protocol. As stated under "Sulphur Dioxide Protocols" Canada has already exceeded that commitment. In addition, there is a 10% (100,000 tonne) reduction in stationary source NO_x emissions by year 2000, and NO_x emission controls on mobile sources equivalent to those in the U.S. Canada is on track to achieve these additional commitments. The SO₂ reductions were achieved through cooperative federal-provincial efforts as noted under the "Sulphur Dioxide Protocol". The 10% stationary source NO_x reduction commitment has already been achieved, primarily by new emission control requirements on automobiles and cooperative federal-provincial programs under the national NO_x/VOC Management Plan. Canada has also introduced new mobile source NO_x emission standards equivalent to current U.S. standards through Memoranda of Understanding with automobile and engine manufacturers. We expect to keep pace with additional U.S. standards through implementation of measures proposed by the federal-provincial Task Force on Cleaner Vehicles and Fuels and agreed to by the Canadian Council of Ministers of the Environment.

In November 1994, the bi-national Air Quality Committee released its second Progress Report on the Air Quality Agreement. A comprehensive review of the Agreement, which will include public consultation, will be initiated in 1995 and completed in 1996.

CEPA Part VI: Controlling the Disposal of Substances at Sea

Environment Canada regulates the disposal of substances at sea and meets its international obligations under the London Convention 1972 by means of a system of permits under CEPA, Part VI, and the Ocean Dumping Regulations. Canada is committed to strong and effective controls on ocean disposal which includes:

- ▶ the disposal of all types of material at sea, including destruction at sea by incineration; and
- ▶ the loading of wastes on ships, aircraft, platforms, or other structures for disposal at sea.

Permits for Ocean Dumping

Each application for disposal at sea is separately evaluated to determine if a permit will be issued. Disposal at sea is permitted only for non-hazardous substances and where it is the environmentally preferable and practical alternative. Permits are not granted if practical opportunities are available to recycle, reuse or treat the waste.

Permits typically govern timing, handling, storing, loading, placement at the disposal site, and monitoring requirements. Environment Canada will not grant a permit if the proposed disposal activity is prohibited under any Act of Parliament, or if a licence or permit required under any other Act has not been obtained. The Ocean Dumping Regulations ensure the federal government is taking a comprehensive approach to waste management and pollution prevention.

Anyone applying for a permit from Environment Canada must publish a notice of intent in a newspaper of general circulation in the vicinity of the proposed operation. This notice must outline the type of material, and the intended locations for the loading and disposal. The applicant then submits this published announcement with a permit application. The notice of intent allows interested people to voice their concerns and have them addressed as part of Environment Canada's application assessment procedure. In addition, all ocean disposal permits and amendments to permits must be published in the *Canada Gazette* before they come into force.

Environment Canada considers a number of factors before granting a permit, including:

- ▶ waste audits;
- ▶ alternatives to ocean disposal;
- ▶ potential environmental impacts, and
- ▶ conflicts with other legitimate uses of the sea.

Inert materials or uncontaminated materials of natural origin are considered suitable for ocean disposal. The majority of the material disposed at sea is dredged material which must be moved to keep shipping channels and harbours clear for navigation and commerce. Fish waste which cannot be recycled as fertilizer, animal feed or other products may be permitted for disposal at sea. Other wastes which may be considered suitable for ocean disposal include scrap metal and decommissioned vessels.

Inspections and investigations are carried out to ensure compliance. Disposal site monitoring is used to verify that permit conditions are met and that assumptions made during the permit review and site selection process were correct and sufficient to protect the environment.

Permits Granted in 1994-95

Over the past year, Environment Canada issued 123 permits for the disposal of an estimated 7.8 million tonnes of material. This quantity reflects the amount approved for disposal as opposed to the actual quantity disposed of at sea. Disposal activities are still ongoing for many permits issued. Overall from last year, this represents a major drop in the total number of permits issued (43 percent), but a slight increase in the total quantity permitted (3 percent).

Fifty-seven permits, or almost 46 percent of the permits issued, were for the disposal of dredged material containing rocks, gravel, sand, silt, clay and wood wastes. This is 22 fewer permits than the previous year. The volume approved for disposal decreased marginally by 6 percent from 6.7 million tonnes in 1993-94 to 6.3 million tonnes this year. The quantity of dredged material approved for disposal varies

each year and depends on the number of dredging projects that exceed 100,000 cubic metres (m³) or 130,000 tonnes.

Another 49 percent of the permits issued covered the disposal of fisheries waste, including offal, shells, herring waste and fish processing wastewater. While fisheries waste accounted for 60 permits, the quantity approved for disposal amounted to only 61,329 tonnes or less than 1 percent of all the material approved. From the previous year, this is a 52 percent drop in the permits issued and a 38 percent drop in the quantity permitted. A substantial drop in permits issued for fisheries wastes was expected this year owing to the continuing difficulties facing the east coast fishery.

Excavation material from construction sites on land, mostly soil and rocks, accounted for 4 permits or about 3 percent of all permits issued and 1.4 million tonnes or 18 percent of the material approved for disposal. This large quantity of material accounted for the slight increase in the total quantity permitted.

Two other permits were issued in 1994-95: one for a 3,051 tonne vessel to create a diving attraction—the HCMS Saguenay—and another for small weather instruments (dropsondes) which were remotely deployed in the Beaufort Sea as part of a study and would automatically sink after use. These permits accounted for 4 percent of those issued and less than 0.05 percent (3,051 tonnes) of the total quantity of waste approved for disposal.

Quantities for Permits Issued - 1994-95

Material	Quantity (tonnes)	# of Permits	% of Permits	% of Quantity
Dredgings	6,333,560	57	46.35	81.45
Excavation	1,378,000	4	3.25	17.72
Fish Waste	61,329	60	48.78	0.79
Vessels	3,051	1	0.81	0.04
Dropsondes	0.05	1	0.81	>0.01
TOTAL	7,775,940	123	100.00	100.00

Quantities Permitted by Region - 1994-95

Material	Atlantic Region		Pacific Region		Quebec Region		Northern Region	
	# of Permit	Quantity (tonnes)	# of Permits	Quantity (tonnes)	# of Permit	Quantity (tonnes)	# of Permit	Quantity (tonnes)
Dredgings	22	2,877,51	16	3,254,550	19	201,500	0	0
Excavation	0	0	4	1,378,000	0	0	0	0
Fish Waste	60	61,329	0	0	0	0	0	0
Vessels	1	3,051	0	0	0	0	0	0
Dropsondes	0	0	0	0	0	0	1	0.05
TOTAL	83	2,941,89	20	4,632,550	19	201,500	1	0.05

Permits Rejected in 1994-95

Environment Canada did not reject any applications in the past year as all the applications received met the regulatory requirements.

Emergency Disposal off Newfoundland

On February 18, 1995, the Russian container ship M/C Mor UK, off the coast of Newfoundland enroute from Bremerhaven to Montreal, reported that it had sustained storm damage. A container had leaked 1.5 tonnes of liquid sodium borohydride, which is extremely corrosive and emits hydrogen gas creating a risk of explosion. The captain radioed the Canadian Coast Guard for permission to dispose of the material at sea. Environment Canada and CANUTEC, the federal government's emergency information centre for dangerous goods were notified. Permission was given to discharge the material under CEPA section 68(1). The vessel proceeded to do so slowly over a distance of 150 miles. Upon arrival in Montreal on February 20, 1995, and without further incident, the vessel was inspected by the Coast Guard and the remaining cargo was accounted for. A report under section 64(4) was filed February 20, 1995.

Regional Forecasts for 1995-96

In the Atlantic Region, the number of permits for dredging is expected to increase as the historical ten-year dredging cycle continues. For fisheries waste, the number of permits issued is expected to remain unchanged from this year because of the depleted fish stocks. In the Quebec Region and the Pacific and Yukon Region, maintenance dredging is expected to remain at stable levels. No dredging applications are expected in the Prairie and Northern Region.

Research to Support Ocean Dumping Regulations

Environment Canada continues to improve the tools it uses to assess the materials intended for disposal at sea. Bioassays are becoming standard assessment tools to evaluate the effects of contaminants in the marine environment. Researchers have already developed several standard protocols to assess the quality of municipal and industrial effluents, and work on sediment bioassays is well underway.

Three new Canadian sediment bioassays to evaluate crustacean mortality, sea urchin reproduction and fluorescence from photoluminescent bacteria have been completed and published. As well, work is continuing on a bioassay that examines changes in the growth of marine worms. A sediment test for bioaccumulation of trace contaminants is being developed based on a test developed in the United States. In addition, guidance to aid in the interpretation of these bioassays is being developed to ensure they are applied in a consistent manner. As part of this work, a pollution gradient study, which examines effects over decreasing concentrations of pollutants from a single source, will be undertaken over the next two years.

Recommendations on methods to develop marine environmental quality guidelines were made in 1992 and were used to develop a protocol for deriving sediment quality guidelines that was adopted by CCME in March 1995. From this protocol, draft guidelines for several PAHs, cadmium and mercury have been developed. Further guidelines are expected to be completed within this fiscal year. They comprise: PCBs, lead, copper, zinc, arsenic, nickel, chromium, and dioxins. These guidelines will allow the department to establish contaminant screening levels at the "no effect" concentration level. These screening levels are part of a tiered testing approach for assessing materials for ocean disposal. Where materials are found to have contaminants above screening levels, bioassays will be required to evaluate their suitability for ocean disposal. Eventually, Environment Canada will establish rejection levels or levels above which adverse effects have been demonstrated to occur. Above rejection levels, no ocean disposal would be allowed.

Special research projects occasionally arise from unique ocean disposal activities. In December 1992, a permit was issued to sink the 2,370 tonne HMCS Chaudière, a Tribal class destroyer, and now a diving attraction north of Vancouver. A program was instituted to observe any effects at the disposal site and data acquired during the summer of 1993 showed the old destroyer was home for a wide variety of marine life. In 1994, further video surveys showed a rich abundance of marine life completely covering the vessel. As well, no evidence of chemical contamination in the water and nearby sediments has been found.

As a result of the April 1993 decision to revoke a permit to dispose of scrap metal issued to Panarctic Oils Ltd., a research project has been initiated to evaluate the environmental impact of stockpiling scrap metal on land in

the Arctic. To date, no effects on the surrounding soil or water have been observed and further inspections will continue annually. This research will provide valuable data on stockpiling on land as a waste disposal option in the North.

In May 1994, the results of a major monitoring program carried out in Cambridge Bay, an old Distant Early Warning (DEW) Line radar site, were released. Extensive video of the seafloor was taken and the sediment and marine life were sampled to evaluate the presence of chemical contaminants. A large amount of debris was found on the seafloor including: wreckage from two aircraft, a large number of barrels, old vehicles, household debris, and an electronics cabinet. While PCB concentrations in sediment and fish were elevated compared to pristine conditions, these concentrations were similar to other harbours in the North. The PCBs appeared to be associated with the local town dump as well as the radar site. Results for other contaminants were similar to the nearby pristine site sampled for comparison as well as other pristine areas previously studied.

International Activities

Members of the London Convention 1972 have embarked upon a three-year amendment process to address immediate and long term disposal at sea issues. Amendments to ban the sea disposal of radioactive waste and the sea disposal or incineration at sea of industrial wastes were agreed to in 1993 by Canada and the other 71 member countries. Canada has never issued permits for radioactive waste disposal or incineration of industrial wastes at sea. As well, sea disposal of industrial wastes was discontinued in 1993 and a *de minimus* (exemption) level for radioactive substances will be prescribed by the Convention at a later stage. Canada implemented these amendments to the Convention through changes to CEPA and the Ocean Dumping Regulations.

Long term proposals to update the Convention include:

- ▶ the adoption of the Waste Assessment Framework;
- ▶ the definition of a precautionary approach;
- ▶ extending the Convention to include internal marine water;
- ▶ prohibiting export of wastes for disposal at sea; and
- ▶ strengthening technical cooperation and assistance.

CEPA, Part VI, already includes Canada's internal marine waters and the Waste Assessment Framework was used as the basis for the new CEPA application form for disposal at sea. The Waste Assessment Framework sets out a scientific and precautionary process to evaluate a substance proposed for ocean disposal. These amendments were also discussed and supported during national consultations in 1993 and in February 1995. Canada is promoting the adoption of these amendments within the Convention and the amendment process should be completed by 1996.

Ocean Dumping Action Plan

In November 1991, Environment Canada established the Ocean Dumping Control Action Plan. This initiative devotes additional resources over six years to safeguarding the marine environment. Specifically, funds are directed towards:

- ▶ revision of the regulations;
- ▶ improved monitoring;
- ▶ improved support for science;
- ▶ research; and
- ▶ a plastic debris program.

Since the implementation of this plan, monitoring guidelines are progressively being developed, field tested and phased into routine disposal site monitoring. Interim Monitoring Guidelines covering physical and chemical aspects were published in July 1993 and Biological Monitoring Guidelines were added recently. These guidelines address dredged material disposal only and consideration will be given to include other materials in the future. Field testing of these guidelines is ongoing at three disposal sites; one on the Pacific coast and two on the Atlantic.

New marine environmental quality guidelines and biological assessment tools are also being developed as discussed under research to support the *Ocean Dumping Regulations*.

Under the marine plastic debris program, the training of volunteers to conduct long-term surveys was completed in November 1994, and surveys are now underway. A report detailing the first year's results will be prepared at the end of 1995. As well, information products including a newsletter and fact sheet, are available.

Amendments to the Ocean Dumping Regulations and CEPA

As previously mentioned, Canada agreed to ban the disposal of industrial and radioactive wastes at sea and implemented these changes by amending relevant parts of the *Ocean Dumping Regulations* and Schedule III of CEPA. These changes came into force on September 21, 1994.

The first amendments to the *Ocean Dumping Regulations* came into force on September 30, 1993, as part of a two-phased approach aimed at strengthening controls to safeguard the marine environment. The application fees were replaced by a flat fee of \$2,500 for all applicants including federal departments, and additional information requirements concerning project justification, evaluation of alternatives, and a waste audit, were specified.

The second phase is planned for 1996/97 and consists of proposed new environmental assessment procedures and standards to better account for effects on the marine environment. Consultations were undertaken across Canada during October 1993 and February 1995 in preparation for developing the Phase II Regulatory Amendments. Changes that are being contemplated include:

- ▶ adopting a tiered testing approach to evaluate materials for ocean disposal;
- ▶ new marine environmental quality guidelines and biological assessment tools; and
- ▶ incorporating the Waste Assessment Framework of the London Convention 1972.

The Parliamentary review of CEPA was initiated in June 1994 and may result in other revisions to CEPA, Part VI, and the Regulations such as:

- ▶ introducing a permit fee based on the type and quantity of material disposed;
- ▶ modifying Schedule III to reflect a reverse listing approach, if adopted by parties to the London Convention 1972;
- ▶ clarifying the definition of dumping; and
- ▶ harmonizing Part VI inspector's powers with those under other parts of the Act.

Though by world standards the Canadian marine environment is relatively uncontaminated, Canada's territorial waters do have some contamination problems, especially in harbours, estuaries and near shore areas. Part VI of the *Canadian Environmental Protection Act* (CEPA) regulates disposal at sea and is one of the measures in place to protect Canada's marine environment through pollution prevention and coastal zone management.

CEPA Part VII: General Information

Notices of Objection and Boards of Review

The public may file a "notice of objection" to a decision or proposed regulation.

Because CEPA is organized by subject areas, guidelines or notices of objection appear in numerous sections of the Act. For example, section 51(2) covers notices dealing with nutrients, while section 62(2) details notices related to controls on international air pollution, and section 74 addresses objections relating to ocean dumping permits. Each subject area has its own administrative requirements for notices of objection.

Under procedures set out in sections 89 to 97 of CEPA, the Ministers may establish a board of review to examine a notice of objection. To date, the federal government has not established any boards of review, although some notices of objection have been filed.

Environment Canada has developed procedural rules to govern matters such as administration, written submissions, evidence, confidentiality of documents, public access, conduct of hearings and reporting. The "Administrative Rules for Environmental Protection Boards of Review" will be published in the *Canadian Gazette Part I*. Publication of the final rules in the *Canada Gazette Part II* is expected by the fall of 1995.

Enforcement and Compliance

Laws must be effectively enforced. Enforcement must be fair and nationally consistent. All people responsible for administering legislation and those who comply with it must know what is expected of them. These are the reasons that Environment Canada developed an Enforcement and Compliance Policy for CEPA. This policy, prepared in cooperation with the Department of Justice, guides Environment Canada in the Enforcement of CEPA and its regulations. While conducting inspections to verify compliance with the regulations, inspectors follow the policy and determine how to respond to a violation. They consider, among other things, the nature of the offence, the violator's willingness to comply and the violator's past compliance history.

Stronger Enforcement Mechanisms

Environment Canada is continuing to implement an enhanced enforcement program, announced in December 1991 and designed to strengthen the government's ability to enforce environmental laws. The Program provides additional resources to help enforce CEPA regulations.

The funds also enable Environment Canada to develop specialized training courses; negotiate agreements and work-sharing arrangements with the provinces, territories and other federal departments; and create an integrated, computerized information system to support enforcement.

Office of Enforcement

The office of Enforcement, created in July 1991, has responsibilities which include:

- ▶ providing overall functional direction for investigations, inspections and other enforcement actions;
- ▶ developing and monitoring the annual National Inspection Plan;
- ▶ developing enforcement training courses;
- ▶ delivering the annual National Training Program to inspectors and investigators;
- ▶ reviewing new regulations; and
- ▶ developing a management information system.

Inspections

Inspectors verify compliance with CEPA and its regulations. As part of this job, they may conduct inspections; witness compliance tests; check records, files and other documents required by regulation to be maintained; sample substances, effluents and emissions; and check data and reports filed with Environment Canada.

Investigations

Both investigators and inspectors examine suspected violations. When they decide that a violation has occurred, they take enforcement action in accordance with CEPA Enforcement and Compliance Policy.

In 1994-95, many enforcement actions resulted in warnings, given when the degree of harm or potential harm to the environment, human life or human health appeared to be minimal.

When there is an actual or potential release of a substance in contravention of CEPA regulations, enforcement officers use directions. CEPA requires that parties owning, managing or controlling substances take reasonable emergency measures to remedy any dangerous condition, or to reduce any danger to the environment, human life or human health that resulted, or may result, from a release. When they fail to take necessary measures to protect the public, inspectors issue directions.

When an alleged violation meets the criteria for prosecution contained in the CEPA Enforcement and Compliance Policy, enforcement officers undertake investigations which may lead to court action.

CEPA Section 108: Applications for Investigations

One of the guiding principles of CEPA's Enforcement and Compliance Policy is to encourage people to report suspected violations to enforcement officers.

Under section 108 of CEPA, any two residents of Canada (18 years of age or older) who believe that an offence has been committed under CEPA may ask the Minister of the Environment for an investigation of the alleged offence.

The alleged offence must meet conditions set out in section 108 before an investigation can begin. If the alleged offence meets these conditions, section 109 requires that an investigation take place to determine the facts relating to the alleged offence. Within 90 days, the Minister of Environment must report to the applicants on the progress of the investigation and the proposed action.

One investigation was pursued under section 108 during the past year. No violation of CEPA was found.

Uniform Enforcement Guidelines

To complement CEPA's Enforcement and Compliance Policy, Environment Canada continued, during the fiscal year 1994-95, to draft Uniform Enforcement Guidelines (UEGs) for priority Regulations:

- ▶ Vinyl Chloride Release Regulations;
- ▶ New Substances Notification Regulations;
- ▶ Ozone-depleting Substances Regulations;
- ▶ Ozone-depleting Substances Products Regulation;
- ▶ Federal Mobile PCB Treatment and Destruction Regulations;
- ▶ Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations.

Additionally, Working Groups were established to develop, *Implementation Strategies* for both the PCB and the Export and Import of Hazardous Wastes Regulations. These strategies further elaborate on the UEGs in that they include compliance verification activities for specific provisions as well as suggested enforcement actions for possible infractions. Section by section analysis of these regulations incorporates legal, technical and enforceability issues as background for inspectors. This aids in the provision of overall guidance and inspection priorities.

National Inspection Plan

The National Inspection Plan (NIP), an annual work plan, identifies the number and types of inspections to be carried out under CEPA regulations. A collaboration between staff at Environment Canada's headquarters and regional offices, the plan uses a target oriented approach to focus on the most serious environmental threats in each region. In implementing the NIP, Environment Canada carries out inspections, verifies documents and data submitted by regulatees in compliance with regulatory requirements and evaluates compliance testing results.

National Training Program

Training continues to be a major element of Environment Canada's environmental protection enforcement program. The addition of the wildlife enforcement function to the Office of Enforcement in the fall of 1993 has meant that a new range of special training requirements must now also be met. Similarly, the signing of various federal/provincial administrative agreements has introduced a need to train provincial staff as they begin to assume the responsibilities of administering federal legislation. The National Training Program has therefore been expanded to ensure that pollution and wildlife enforcement officers and analysts are trained to perform duties that involve basic inspection and investigation skills, and very specialized regulation-specific enforcement activities.

In 1994-1995, Environment Canada delivered courses on:

- ▶ Train the trainers

- ▶ Basic Inspectors Course
- ▶ Expert Witness Course
- ▶ Health and Safety Course;
- ▶ Ozone Depleting Substances Regulations;
- ▶ New Substances Notification Regulations;
- ▶ Pulp and Paper Mill Defoamer and Woodchip Regulations (for provincial staff in B.C.);
- ▶ Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations (for provincial staff in B.C.).

Environment Canada has continued to develop a health and safety guide, and a field sampling manual for both inspectors and investigators. It also participates in federal-provincial working groups for both wildlife and environmental protection, working with our partners to identify ways of better coordinating training and resources, and learning from the experience of others.

Internationally, Environment Canada participated in the International Environmental Enforcement Conference in Mexico. This event raised the profile of our program and follows up with Canada's obligations under North American Free Trade Agreement (NAFTA) and the North American Commission on Environmental Cooperation (NACEC) in Montreal. EC helped to present a course in Chile in March 1995. This participation was made possible through an agreement between the Government of Canada and Chile.

Computerized Information System

In 1994-95, the Office of Enforcement was actively involved in the programming and installation of the Enforcement Activities Tracking System (EATS). During the past year, the Office of Enforcement worked extensively on programming, testing and debugging the software. The Atlantic Region was selected as the pilot region and received training and a pre-release version of EATS in June 1994. By March 31, 1995, EATS had been installed in each of the five regional offices and Headquarters.

A committee with members from the regions and headquarters provided advice and guidance on the development of the system throughout the year.

Enforcement Activities

The following table shows 1994-95 enforcement activities under CEPA. If you have any questions, you may contact the Office of Enforcement at (819) 953-1174.

<i>Enforcement Activities (1994-95)</i>							
Regulations	Inspections	Investigations	Warnings		Directions	Prosecutions	Convictions
			Govt.	Others			
Storage of PCB Material	425	3	21	57		1	1
PCB Regulations	244	7		3			
PCB Waste Export	1						
PCB Destruction	9						
Secondary Lead	36			1			
Vinyl Chloride	1					1	
Asbestos Mines and Mills	26						
Mercury, Chlor-Alkali	12						
Gasoline	13	1					2
Contaminated Fuel	4						
Ozone-depleting #1, #2, #4	18	8		6		2	1
Ozone-depleting (Products)	184	29		19		2	2
Ocean Dumping	132	4		2		1	2
Export-Import Hazardous Waste	170	11		8		1	1
Phosphorous Concentration	33	1		1			
Dioxins and Furans	30			9			
Defoamer and Wood Chips	20						
Others	4						
Total	1,362	64	21	106	0	8	9

Prosecutions (April 1, 1994 to March 31, 1995)

<i>Company Name and Address</i>	<i>Status</i>	<i>Offence Date and Location</i>	<i>Date Charged</i>	<i>Sections/Offences</i>	<i>Court Date</i>	<i>Result</i>	<i>Penalty</i>	<i>Notes</i>
ATLANTIC REGION								
Miramachi Pulp & Paper Inc. Newcastle, NB	Concluded	94/03/18	94/06/16	CEPA - 1 Count PCB Storage Regulations 1 Count Chlorobiphenyls Regulations App. 451 of PCB oil allegedly leaked into environment	94/08/09	Guilty Plea	\$100 fine and court order to pay \$8,000 to the N.B. Dept. of Education for Environ- mental Education in area of offence and additional \$8,000 to N.B. Community College Scholarship Fund.	The charge under the chlorobiphenyls was withdrawn. The company has agreed to pay an additional \$500 to Environment Canada for publication in a newspaper of facts related to the case.
QUEBEC REGION								
Anachemia Ltd. 500, 2nd Avenue Lachine, Québec	In Trial	91/08/06- 91/11/19 Montréal, Québec	94/10/14	CEPA - 5 Counts Ozone-depleting Substances #1. Illegal importation of products containing CFC's	95/02/24			
Accès-O-Tonik 2095, Blvd. Charest, West Sainte-Foy, Québec	Concluded	93/10/18 Sainte-Foy, Québec	94/05/13	CEPA - Ozone-depleting Substances #3. 2 Counts Sale of products containing CFCs	94/08/26	Guilty Plea	\$600 Fine	
Zep du Canada Inc. 660, Lépine Avenue Dorval, Québec	Concluded	94/01/19 Dorval, Québec	94/04/14	CEPA - Ozone-depleting Substances #3. 3 Counts Illegal importation, offer for sale and sale of products containing CFCs	94/09/06	Guilty Plea	\$9,600 fine and assume the respon- sibility for the cost of the destruction of CFC containers.	
ONTARIO REGION								
Biocan Waste Management Systems and Gary Zimak Thunder Bay, Ontario	Concluded	93/08/05 Canada Customs Thunder Bay, Ontario	94/06/14	CEPA - Export and Import of Hazardous Waste Regulations	94/09/26	Guilty Plea	Biocan: \$5,000 fine President: \$2,500 fine	Also community service for one year.
Imperial Oil Chemicals Division, Sarnia, Ontario	For Trial	June 19, July 12, 1993	95/01/30	CEPA - 4 counts: Vinyl Chloride Release Regulation	95/11/06			Two counts against Imperial Oil and two counts against Plant Manager
PRAIRIE & NORTHERN REGION								
No prosecutions during fiscal year 1994-95.								
PACIFIC & YUKON REGION								
Vandervalk-Cornelius	Concluded	94/09/0	94/11/21	CEPA - Ocean Dumping 1 count	94/12/01	Guilty Plea	\$500 fine	\$145 restitution 35 hours of community service and a public apology.
Bella Coola Fisheries Ltd. 9829 River Road Delta, B.C.	Concluded	March 1992; Feb., Aug., Sept. and Dec. 1993	94/04/07	CEPA - Ozone-depleting Substances #2 - 5 Counts Importation of Ozone- depleting Substances	94/11/23	Guilty Plea	\$7,500 fine	

Health Canada's Contributions under CEPA

While CEPA's general intent and the joint achievements of Environment Canada and Health Canada have been fully described elsewhere in this report, the following section summarizes Health Canada's major achievements under CEPA during the past year. Most of the work has been undertaken by the staff of the Environmental Health Directorate of the Health Protection Branch (HPB).

Health Canada is jointly responsible with Environment Canada for assessing and managing the risks to human health from toxic substances. CEPA includes detailed provisions for dealing with potential health risks from existing and new substances, including products of biotechnology, as well as from hazardous wastes.

Environmental Quality (CEPA Part I)

Section 8 of CEPA, which deals with ensuring the quality of the environment, gives the Minister of the Environment responsibility for formulating environmental quality objectives, guidelines and codes of practice. The Minister of Health has similar authority to preserve and improve public health under section 9.

As part of this mandate, Environment Canada and Health Canada work together to develop National Ambient Air Quality Objectives for a number of air pollutants. A draft protocol for the development of assessments and the setting of objectives was developed by the Federal-Provincial Working Group on Air Quality Objectives and Guidelines. Work towards finalizing the protocol is continuing.

An assessment document for fine particulates was drafted and is undergoing final revision, to be followed by the derivation of a new objective(s). Assessments of carbon monoxide, nitrogen dioxide, and ground level ozone are nearing completion. Through the auspices of the Canada-U.S. Air Quality Agreement, information on these substances has been exchanged at a technical level and common management strategies are being developed.

Work continued towards finalizing new objectives for gaseous fluorides and reduced sulphur compounds.

Regulating Toxic Substances (CEPA Part II)

Priority Substances

Health Canada has continued to contribute to the Priority Substances Assessment Program of CEPA (sections 12 and 13). In 1994-95, the Approach Paper "Human Health Risk Assessment for Priority Substances" was completed and released. Following the completion of assessments of the first Priority Substances List (PSL) in 1993/94, the final three Assessment Reports, and health-related Supporting Documentation on eight compounds, were released early in 1994-95.

Thirty-five manuscripts on the health-related assessments completed for compounds on the first PSL were published in a special edition of the Journal of Environmental Science and Health. Draft Environmental Health Criteria Documents were prepared for the International Programme on Chemical Safety for six of the substances included on the first PSL. Preparation of a booklet for publication of reference values for protection of human health in the general environment for compounds included on PSL I was initiated.

Various aspects related to assessment of exposure and effects including fugacity modelling, uncertainty analysis, uncertainty factors and benchmark doses, were evaluated with respect to their relevance and usefulness to the approach adopted to assessment of "toxic" under sub-section 11(c) of CEPA for Priority Substances.

In collaboration with other government departments, the list of candidate substances to be submitted by the federal government to the Ministers' Advisory Panel which will develop the second PSL was finalized. In collaboration with Environment Canada, Health Canada officials are providing the Secretariat for the Advisory Panel, for which two meetings were held in 1994/95.

Background dossiers on substances which are candidates for inclusion on PSL II were prepared for use by the panel preparing that list.

Collecting Information

In carrying out the provisions of CEPA section 17, Environment Canada forwards all information it has collected concerning potential adverse health effects to Health Canada for assessment. Health Canada has received a total of 460 submissions as of March 31, 1995, most of them dealing with hazard data obtained from toxicological studies. In 1994/95, 45 new submissions were received.

The Environmental Health Directorate reviewed the toxicological data on 445 section 17 submissions in 1994/95, and provided advice to Environment Canada on the hazard associated with most of these substances, thereby eliminating the backlog of section 17 submissions.

New Substances

Under sections 25 to 32 of CEPA (substances new to Canada), Health Canada and Environment Canada are jointly responsible for the assessment and control of new substances that are either imported into, or manufactured in, Canada. The work of the two departments is concentrated in two main areas: regulations for reporting chemicals and polymers, and regulations for biotechnology products.

Chemicals and Polymers

The New Substances Notification Regulations for chemicals and polymers came into force on July 1, 1994. Approximately 5,000 transitional substances, first used between 1987 and June 1994, were notified by November 1994. Assessment procedures were established for the health hazard and human exposure evaluation for various categories of notification. Administrative procedures were established within Health Canada for dealing with this large number of notifications.

Health Canada collaborated with Environment Canada in implementing effective communications, including electronic communications, between the two departments in order to exchange information and decisions quickly.

Biotechnology Products (Organisms)

The Environmental Health Directorate has continued to work with Environment Canada to develop notification regulations for new biotechnology products. Health Canada staff participated in the organization and meeting of the Expert Working Group on CEPA New Substances Notification Regulations held in December 1994. Subsequent to the meeting, a formal draft of the regulations for biotechnology products was prepared for publication in *Canada Gazette Part 1*.

In support of this work, Health Canada has prepared guidelines describing the information needed in order to conduct health assessments and, with Environment Canada, has incorporated this information into a Notification Guideline. In addition, Health Canada has been developing approaches for assessing this information. Contract research is ongoing on pathogenicity testing of *Pseudomonas*, indicator testing of microbial consortia, and monitoring of endotoxin.

Staff of the Environmental Health Directorate worked with Environment Canada to develop criteria for the listing of certain biochemicals (proteins) on the Domestic Substances List (DSL) and assisted in the preparation of the Regulatory Impact Analysis Statement (RIAS) for the draft biotechnology regulations.

Managing Toxic Substances

Control of Toxic Substances

Under section 43 of CEPA, both the Minister of Health and the Minister of the Environment have the authority to establish wide-ranging controls in order to manage the risks of toxic substances. The particular responsibility of the Minister of Health, however, is to protect the health of the Canadian public by ensuring that exposure to potentially harmful environmental contaminants is kept within acceptable limits.

Health Canada's risk management activities have centred around the development of risk management options (control options) for those substances that were declared "toxic" for reasons of human health under section 11(c) of CEPA. Control options for "toxic" substances are being developed within the framework of the Strategic Options Process, a multi stakeholder consultations process which will make recommendations for action to the Ministers of the Environment and Health within a 12 to 18 month time frame.

A number of multi stakeholder meetings (so-called Issues Tables) were initiated during 1994-95 for consideration of control options. Health Canada participated in the following meetings where control options for single substances or for toxic substances released from a particular industrial sector were considered:

Single-substance approach:

- ▶ Benzidine
- ▶ 3,3'-dichlorobenzidine
- ▶ Refractory ceramic fibres
- ▶ Short-chain chlorinated paraffins

Sectoral approach:

- ▶ Wood preservation sector (Arsenic, PAH's, HCB, chromium, creosote impregnated wastes)
- ▶ Dry cleaning sector (Tetrachloroethylene)
- ▶ Degreasing sector (Tetrachloroethylene and trichloroethylene)

Participation in the above Issues Tables has involved collecting, compiling and further developing technical information critical to the decision-making process, e.g. linkage of sources and levels of exposure, in order to supplement that found in the assessment reports. Considerable effort has also been expended in developing a consistent and coherent Health Canada position in preparation for negotiations at the multi stakeholder meetings. Other essential input to the risk management process has included reviewing previous and current risk management activities, both in Canada and the international community, ongoing consultations with other stakeholders and a detailed examination of the technical feasibility as well as of socio-economic considerations associated with the implementation of various control options.

During 1994-95, staff of the Environmental Health Directorate of Health Canada participated with Environment Canada in the development of a number of policy matters that have an impact on risk management activities of the federal government. These initiatives include the development of a federal framework for the risk management of toxic substances (the Toxic Substances Management Policy), as well as policy documents concerned with pollution prevention, sustainable development and the greening of government.

Fuels

In accordance with sections 46 and 47 of CEPA (regulation of fuels), as well as with the monitoring provisions of the Act, Health Canada continued to assess the health implications associated with using methylcyclopentadienyl manganese tricarbonyl (MMT) as an octane enhancer in Canadian gasoline.

A health-risk assessment was completed, and indicated that the combustion products of MMT do not represent an added health risk to the Canadian population. MMT is expected to be controlled under other legislation.

Other Activities

Research Activities

Under section 15 of CEPA (information gathering), a number of research activities have continued in the laboratories of the Environmental Health Directorate. The research has included a wide range of projects, including the development of assay methods for determining the harmful effects of potentially toxic substances. In addition, studies have been completed that improve understanding of how toxic substances act on the human body.

Studies on the systemic effects of selected PSL I substances have been completed. These include substances for which data were "insufficient to assess" (di-n-octylphthalate) and others with identified data gaps (chlorinated paraffins and di-2-ethylhexylphthalate). Subchronic studies are in progress on chemicals which are candidates for future PSLs, including acridine and benzothiophene.

A battery of in vitro screening methods are currently in use to evaluate environmental chemicals for adverse effects on endocrine and reproductive function. Novel biomarkers of effect have been incorporated into single generation reproductive toxicity studies and are being used to identify potential hazards to human reproduction from these compounds. An in vitro biomarker for the detection of potential tumour promoting activity of chemicals was developed, that will assist in understanding the mechanism of action of carcinogens.

Research continued on the validation of a transgenic mouse gene mutation assay, which appears to improve substantially the ability to conduct in vivo mutagenicity tests under the CEPA New Substance Notification Regulations. Molecular methodology was developed for the quantization of human and environmental exposure to microbial biotechnology products.

Two contract reports were completed, one on the occurrence of tri- and tetrachloroethylene in smaller community drinking water systems supplied from ground water sources, and one on transformation products of tetrachloroethylene in ground water.

Harmonization

Health Canada has continued to contribute to OECD guideline development, in order to move toward international harmonization of testing and assessment of chemicals and biotechnology products.

Communications

Health Canada continued to communicate the outcome of the PSL I assessments, by publishing Assessment Reports, Departmental Issues Papers and papers in peer-reviewed scientific journals, and prepared draft Environmental Health Criteria documents for the International Programme on Chemical Safety. In addition, Health Canada produced a document outlining how substances are determined "toxic" under CEPA. Versions of this document for both the scientific community and the general public were made available. A paper for the public, outlining Health Canada's approach to biotechnology products was published. A full list of Health Canada publications related to CEPA can be found in Appendix A.

CEPA Across Canada

Environment Canada offices across the country are instrumental in the administrative of CEPA and have been involved in activities featured throughout this report.

Although Canada's five regions share many of the same pollution problems, differences in their geography, natural resources and economies create separate environmental concerns. Regional offices bring these perspectives to the national environmental agenda, which is particularly important in the area of compliance, the regions' first area of responsibility. Within the framework of the annual National Inspection Plan, regional offices can target specific threats directly concerning people in their area.

Regional offices also perform scientific research and keep a close watch on problems in their areas, becoming involved, for example, in assessing materials on the Priority Substances List.

To round out their support of federal activities, the regions deal directly with the public and often represent the Department in negotiations with the provinces and territories on environmental issues.

Atlantic Region

The following describes significant activities which Environment Canada undertook in the Atlantic Region in support of CEPA during the time period April 1994 to March 1995.

Environment Canada continued to provide regulatory guidance to Public Works and Government Services Canada which was the lead agency in attempting to site a mobile PCB destruction facility in the region. After extensive public consultation and independent review, the regional PCB Management Committee decided to discontinue the search for a suitable location. Environment Canada subsequently focussed its efforts on advising regional PCB owners on management options through several workshops which were held in the Region.

The Region continued to collaborate with the Atlantic Provinces to control air quality. The collective governments audited progress under the federal-provincial sulphur dioxide (SO₂) reduction agreements. Additionally, negotiations continued with Newfoundland and Labrador and Prince Edward Island on amendments to the SO₂ reduction agreements and extensions to their applications.

To protect and enhance the air quality of "protected" and other areas of Atlantic Canada and the North East United States, the Region co-chaired an international committee whose primary task was the development of a Regional Air Quality Management Plan.

In its research and monitoring efforts, Atlantic Region:

- ▶ contributed to a national study to measure atmospheric movement of polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzo-p-dioxins and dibenzo-furans (PCDPs/PCDFs);
- ▶ as part of the Regional Organic Contaminants in Precipitation Project, continued to monitor PAHs and chlorinated benzenes at three locations in the Region;
- ▶ produced a data review report on the regional occurrence and effects of eight priority metals;
- ▶ completed a study which measured the regional atmospheric deposition trends of mercury and other heavy metals by sampling raised peat bogs;
- ▶ completed a study which determined environmental concentrations and effects of chlorobenzenes discharged in municipal wastewater and textile mill effluents; and
- ▶ completed a study which measured the reduction of environmental effects due to toxic substance discharge from the Sackville landfill after leachate treatment improvements.

Projects conducted in support of waste management included: the preparation of draft national landfill guidelines for federal facilities which provide criteria for use in the siting, design, construction, operation, closure and post-closure monitoring of solid waste landfills at federal facilities; preparation of a waste reduction manual which will provide guidance to Atlantic Region federal facilities in developing and implementing their waste reduction programs; and completion of a survey to determine the number of municipalities in the region that are implementing waste reduction programs, in order to focus future efforts.

Under the ocean dumping provisions of CEPA, Atlantic Region issued a total of 83 ocean disposal permits and 3 amendments. Through a cooperative headquarters/regional effort, three public consultation meetings were held to explain the proposed revisions of the Ocean Dumping Regulations under CEPA and to seek the public's input to the proposed revision. As part of the Green Plan Initiatives, the Region's staff completed a three-year dump site monitoring program in Saint John Harbour, New Brunswick, to assess the environmental impacts of dredged material disposal and a dumpsite monitoring program was conducted at Bull Arm, Newfoundland to determine the water quality and benthic impacts of disposal of 500,000 cubic metres of earthen materials at sea.

The Region also published a CEPA Five-Year Review which documents the significant accomplishments of the Department in support of CEPA since it was enacted. It demonstrates that the coordination of CEPA activities was largely through the working of the Regional Toxic Chemicals Committee which was implemented for that purpose.

Enforcement efforts have included 269 inspections to monitor compliance with the following regulations: Storage of PCB Materials, Chlorobiphenyls, Ozone-depleting Substances, Chlor-alkali Mercury Release, Gasoline, Contaminated Fuels, Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans, Export and Import of Hazardous Wastes, Ocean Dumping, Asbestos Mines and Mills, Fuels Information, and Phosphorous Concentrations. These inspections resulted in seven investigations, seven warnings, one direction, one prosecution and one conviction.

Quebec Region

In 1994-95, the Quebec Region maintained an active enforcement program of ten regulations under CEPA. For inspections conducted during the year, priority was given to the enforcement of regulations dealing with the storage of material containing PCBs, the import and export of hazardous waste, chlorinated dioxin and furan in pulp and paper mill effluent, and the ocean dumping of waste and chlorinated biphenyls. This year was also marked by the signature of an administrative agreement on the enforcement in Quebec of the federal regulation focusing on the pulp and paper sector and the implementation of mechanisms to ensure a "single window" approach to industry.

The 461 inspections conducted resulted in 45 warnings and 15 investigations. Three cases were brought before the Courts.

The Region continues to be actively involved in projects dealing with the management of ozone-depleting substances (ODS) and the reduction of their use. An inventory of the ODS in federal facilities in the Quebec Region has been developed. A one-day workshop on the management of these substances and on replacement systems has also been organized for various Departments.

The Quebec Region has issued 19 ocean dumping permits for the disposal of dredged material from ports in the Gaspé and Magdalen Islands areas. It has pursued the environmental monitoring of a dumping site in Chaleur Bay. In the course of the regulatory review of Part VI of CEPA, the Region organized a consultation session to hear the public's concerns with regard to ocean dumping of waste.

In order to produce the 1993 National Pollutant Release Inventory (NPRI), the Region developed a list of potential companies affected by this program and provided technical support to clients by organizing five training workshops. An updated version of the list of the companies affected was produced. Following this update, 400 companies will produce a report for the Region, in 1994, as opposed to 280 in 1993.

The Region has conducted a review of the environmental situation of federal facilities in Quebec. We have also assessed the compliance of Environment Canada facilities with environmental requirements. A three-year management plan has been developed for Federal Agencies and Departments (FAD). Approximately 600 copies of the first edition of a newsletter entitled *Virage environnemental*, which will be published on a quarterly basis, have been sent to the FADs. A three and a half day technical workshop on hazardous material and waste as well as emergencies was attended by 75 participants from various departments. A management guide on the subject, prepared by the region, has also been distributed. On the question of federal PCBs, Environment Canada has made a proposal to other federal departments: that a project to eliminate PCBs be developed in conjunction with the Quebec Ministry of Environment and Wildlife's venture. The project has been submitted to the Public Hearing Board on Environment. The Office's recommendations did not favour the federal government's involvement in the Quebec Ministry of Environment and Wildlife's project. Environment Canada has since developed an interdepartmental

management plan for federal PCBs and recommended that departments come to an understanding and reduce the volume of PCB waste prior to its removal.

Ontario Region

During 1994-95, Ontario Region maintained an active compliance inspection program. Inspection priorities for the year included implementation of the Storage of PCB Material Regulations, Chlorobiphenyls Regulations, Federal Mobile PCB Treatment and Destruction Regulation, Ozone-depleting Substances #1 Regulation, Ozone-depleting Substances #2 Regulation, Ozone-depleting Substances #3 Regulation, Ozone-depleting Substances #4 Regulation, Vinyl Chloride Release Regulation, Secondary Lead Smelter Release Regulations, Chlor-Alkali Mercury Release Regulations, Export and Import of Hazardous Waste Regulations, Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations.

The Region conducted a total of 374 inspections under CEPA, resulting in 39 violations. In other enforcement action, it also initiated 102 occurrence reports, resulting in 38 investigations into suspected violations of CEPA. A total of 43 warning letters were issued.

As part of a program to encourage compliance, Ontario Region hosted several workshops for federal departments on PCBs, ozone-depleting substances, underground storage tanks and contaminated sites. Staff also made numerous presentations to headquarters and facilities staff at sites such as defence bases, research establishments, correctional facilities and airports regarding regulatory requirements under CEPA and other federal legislation. A compliance promotion newsletter called *Compro Update* was launched and two issues were published and distributed to approximately 500 federal government contacts. A compliance promotion bulletin on the storage of PCB material was updated and advice was provided to federal staff setting up several new PCB storage sites. The Region worked closely with Transport Canada and National Defence Staff to assist in the implementation of the CEPA glycol guidelines for federal airports. A promotional program was undertaken to increase awareness of issues surrounding the use of ozone-depleting substances. Compliance promotion posters regarding the prevention of spills of hazardous substances such as CEPA regulated substances were completed and distributed to federal contacts. Compliance promotion information was provided on a daily basis in response to telephone inquiries from federal government staff.

In addition, Ontario Region continued discussions with the province for an administrative agreement covering pulp and paper regulations made under CEPA as well as the *Fisheries Act*.

Prairie and Northern Region

The first equivalency agreement made under CEPA was signed and took effect in 1994. In recognition of equivalent provincial requirements, this harmonization mechanism suspends the application of four CEPA regulations in Alberta. The regulations which are subject to the agreement are the Vinyl Chloride Release Regulations, Secondary Lead Smelter Release Regulations, Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations and the provisions of the Pulp and Paper Mill Defoamer and Wood Chip Regulations dealing with the use of defoamers and wood chips. Provincial requirements which achieve an equivalent effect to these regulations continue to be enforced by the provincial officials. Environment Canada is kept informed of compliance levels in the relevant industries and any enforcement actions taken by Alberta. Throughout the year, the level of compliance of the affected industries remained high.

An administrative agreement made under CEPA with the province of Saskatchewan also was signed and took effect in 1994. This agreement applies to all aspects of CEPA and its regulations. A management committee for the agreement has been established and implementation of the agreement has been initiated: a one-window spill reporting arrangement through the province is now in effect; a training program for provincial inspectors is being prepared; and federal and provincial inspection activity is now coordinated through joint planning of inspection schedules.

The region made two presentations to the Standing Committee on Environment and Sustainable Development as part of the five-year review of CEPA. A presentation pertaining to the region as a whole was made in Edmonton. The presentations described unique features of the region, highlights of CEPA implementation since 1988 and

recommendations for improving the effectiveness of CEPA. Recommendations included the development of additional guidelines and regulations under Part IV and a wider range of enforcement responses such as negotiated compliance settlements and administratively imposed monetary penalties.

Compliance and enforcement activity in 1994-1995 included the conduct of 160 inspections and nine investigations and the issuance of nine warnings. One prosecution under the Gasoline Regulations was concluded and resulted in a \$9000 fine for the import and offering for sale of leaded gasoline. To promote compliance with CEPA requirements, plain language pamphlets were developed and mailed out to potential regulatees explaining the requirements of the revisions to the Ozone-depleting Substances Regulations, the Ozone-depleting Substances Products Regulations and the National Pollutant Release Inventory.

In an effort to facilitate the implementation of the Federal Code of Environmental Stewardship and to promote compliance with CEPA, three Environmental Awareness workshops for other federal government departments were held in Saskatchewan, Manitoba and Alberta. Presentations at the workshops were given by provincial as well as federal officials. The three-day workshops were well attended and, in addition to CEPA regulations, covered topics such as hazardous chemical management, emergency response planning, property transfers, and pollution prevention.

As a continuation of the Priority Substances List assessment program, the Region initiated the Strategic Options Process (SOP) for the wood preservation industry. As part of the SOP, the Region conducted or supported programs to determine the types and quantities of toxic substances leaching from preserved wood in marine waters off of the east and west coasts, in fresh waters, from stored bridge timbers and from utility poles. The result will be a report to the Ministers of Environment and Health recommending technically and economically feasible ways to reduce the release of CEPA toxic substances from the manufacture and use of preserved wood.

The Region also participated in the planning for the second set of the Priority Substances List toxicity assessments (PSL II). The planning consisted of developing dossiers of information on selected substances proposed by Environment Canada for inclusion on PSL II. The dossiers provided the basis for the final set of substances nominated by Environment Canada for consideration by the PSL II Expert Panel, which will decide on the final list of substances for assessment.

Pacific and Yukon Region

As in other parts of the country, monitoring is an important gauge of environmental quality in the Pacific and Yukon Region. Accordingly, sampling for dioxins, furans, chlorinated phenolic compounds, PAHs, PCBs and organochlorine pesticides in suspended sediment and water continued at sites upstream and downstream from pulp mills in the Fraser River. These contaminants were also sampled in bed sediments from the mainstream and main tributaries throughout the Fraser Basin. As well, as part of the Fraser River Estuary Management Program (FREMP) Water Quality Plan, chlorophenols, chloroguaicols and chlorocatechols, dioxins, furans, PCBs and pesticides were sampled in fish collected from four sites in the lower Fraser River in British Columbia. The same suite of contaminants were sampled in fish collected at seven sites in the basin, upstream of the FREMP area. In the Strait of Georgia and the Fraser Basin, monitoring of contaminants in fish-eating birds continues, with emphasis on biomagnification of dioxins and furans in marine and aquatic food webs. Research on contaminants and productivity in bald eagles has also been initiated.

In British Columbia, dioxin and furan levels in herons and cormorants from the Strait of Georgia have stabilized following an initial decline after implementation of federal and provincial regulations. Bald eagles, which prey on both fish and fish-eating birds, have the highest levels monitored to date, and research is continuing on toxicological effects. It is not known whether the continuing moderate levels are the result of past discharges of pulp mill effluents, or ongoing sources such as air emissions from power boilers using salt-laden logs. In the interior, uptake of dioxin and furan and other organochlorine contaminants in osprey, through aquatic food webs, continues on both the Fraser and Columbia River systems. Toxicological research on osprey on the Thompson River (tributary to the Fraser) is being initiated in 1995. On the lower Columbia River, osprey eggs also have elevated PCB levels, although a specific source is not known.

Lead poisoning of bald eagles continues to be a problem in the lower Fraser Valley, eastern Vancouver and some locations of the B.C. interior. Eagles are exposed to lead when they capture and eat waterfowl either wounded by

lead shot or with lead shot in their gizzards. As a result, the federal and B.C. governments have extended the ban on the use of lead shot for waterfowl hunting to the whole province.

A toxic chemical committee, established by the federal and provincial governments, worked toward addressing the life-cycle management of toxic substances, defined priorities and promoted cooperative programs between the two levels of government in British Columbia.

An investigation of fish contamination in Lake Laberge, requested under section 108 of CEPA by three Yukon residents in 1991, is continuing. In 1994 and 1995, department officials participated in a major workshop on northern contaminants to evaluate scientific information available for information related to a potential CEPA violation. Critical scientific information is not yet available. Although the department concluded there was no evidence of a CEPA violation to date, the investigation remains open.

The Region continues to be actively involved in projects to manage and reduce the use of ozone-depleting substances (ODS). As a member of a provincial ODS Steering Committee, regional staff continue to assist the province in the implementation of the B.C. provincial ODS Regulation. With major funding from the Environmental Innovation Program, a unique two-year research project (to be completed in 1996) began at Simon Fraser University to study the reaction mechanisms for modification of ODS to other useful substances through catalytic dehalogenation. In another project, laboratory comparison of replacement solvents for oil and grease analyses showed tetrachloroethylene as the best alternative to CFC-113; a project has been proposed in 1995-96 to conduct a round-robin interlaboratory study among various private and government laboratories to confirm the acceptability using the new solvent.

By far more antisapstain chemicals are used in B.C. than in any other province. An annual inventory of B.C. antisapstain chemical users has been conducted since 1990. In September 1994, Environment Canada and B.C. Environment jointly published an updated version of the 1983 Code of Practice for Chlorophenate Wood Protection, which covered all commercially available antisapstain chemicals. The updated document provides guidance on the design and operation of chemical application facilities, and on the prevention and control of chemical releases to the environment.

A team of Environment Canada representatives and other government and industry stakeholders have completed a technical and economic profile of the dry cleaning facilities in the Greater Vancouver area. The findings show that tetrachloroethylene consumption among some 300 businesses in the pilot study can be economically reduced over 50% if facilities switch to current generation dry cleaning machines. Consequently, releases of "perc" to the environment via air, water and solid wastes will be reduced by the same amount. The project management team has developed a response strategy which will be examined by the Greater Vancouver Regional District and B.C. Environment in the context of the department's Strategic Options Process on Tetrachloroethylene for the Canadian Dry Cleaning Sector.

Environment Canada and Fletcher Challenge Canada Ltd., released the findings of stack emission and health risk assessment studies on atmospheric dioxin and furan releases from a woodwaste-fired steam-generating boiler, at the company's Elk Falls pulp mill on Vancouver Island. Theoretical modelling of the impact of the emissions on local populations, showed that the boiler emissions contribute on average between one-one thousandth (1/1,000) and one-one hundredth (1/100) of the acceptable dioxin and furan intake established as a guideline by Health Canada. The dioxin emissions from this process are unique to B.C. where chlorides in wood bark from salt-water stored logs trigger the formation of dioxins and furans during combustion. The B.C. pulp companies with tide-water plants have launched a technology development initiative to examine means of reducing the source emissions. Accordingly to the recommendations in the report, monitoring is presently being conducted to verify the results of the modelling studies in the Elk Falls area.

In addition, monitoring of ocean disposal sites continued. A public consultation session with industry and environmental non-government organizations was undertaken on proposed changes to CEPA's Ocean Dumping Regulations and program policy.

Inspection programs in the Pacific and Yukon Region targeted PCB Material storage facilities, In-service PCB equipment, importation and sale of ozone-depleting substances, dioxin and furan releases in pulp mill effluents and the import and export of hazardous wastes. In addition to inspection activities under the Export and Import of Hazardous waste regulations, the region conducted a number of compliance promotion seminars, including one with Alaska hazardous waste shippers who transit Canada and are regulated under CEPA. Coordination of efforts with the

province of B.C., Canada Customs, U.S. Customs and U.S. Environmental Protection Agency (EPA) have also begun to improve intelligence on the movement of hazardous wastes.

A federal-provincial agreement on the administration of regulations for the pulp and paper sector under both the federal *Fisheries Act* and the *Canadian Environmental Protection Act* was signed in September 1994. Under this agreement, a single window to industry is provided through the province of B.C., who administers the *Fisheries Act* requirements and the CEPA Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations and Pulp and Paper Mill Defoamer and Wood Chip Regulations. To facilitate the administration of the agreement, provincial inspectors have been trained and will be designated as CEPA inspectors.

The region also began publishing compliance status reports for each of the CEPA regulations in the region. These reports provide an overall assessment of the compliance rate, identify areas of non-compliance, and name offenders which have been subject to an enforcement response (eg. Warnings and prosecutions). Four investigations were launched into alleged CEPA offences with two successful prosecutions being completed resulting in fines totalling \$8,000.00 and a Court Order requiring community service and restitution. The investigations were for alleged violations of Ozone-depleting Substances and Export and Import of Hazardous Wastes Regulations and the ocean dumping provisions of CEPA (Part VI).

Appendix A: Publications Related to CEPA

Canadian Wildlife Service

- Anonymous. 1994. *Exposure of wildlife to toxic pollution at ACAP sites. Update, Autumn 1994*. Brochure, CWS, Atlantic Region, CWS, Sack., N.B., 2pp. Published.
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