Environment Canada Environnement Canada

# Canadian Environmental Protection Act, 1999

## Annual Report

for April 2008 to March 2009

Canada

# *Canadian Environmental Protection Act, 1999*

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# Foreword

This Annual Report provides an overview of the results achieved under the *Canadian Environmental Protection Act, 1999* (CEPA 1999) from April 1, 2008, to March 31, 2009.

The publication of this report responds to the statutory requirement to provide annual reports to Parliament on the administration and enforcement of the Act.

The chapters are organized according to the major parts of CEPA 1999. Each chapter contains introductory remarks that describe the applicable provisions of the Act followed by a description of the key results achieved under that part in the reporting period.

This report includes the following mandatory information:

- Section 1.1 describes the activities of the National Advisory Committee. There were no other committees established under paragraph 7(1)(*a*) of CEPA 1999 during the reporting period.
- Section 1.2 describes the activities under the Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem.
- Section 1.3 describes the activities under the Canada–Quebec Administrative Agreement.
- Section 1.4 describes the activities under the Canada–Saskatchewan Administrative Agreement.
- Section 1.5 describes the activities under the Canada–Alberta Equivalency Agreement.
- Section 3.2 provides examples of the types of research initiatives under way and their key contributions in the reporting period. Environment Canada and Health Canada scientists published numerous reports, papers, book chapters, articles and manuscripts on subjects related to CEPA 1999. This impressive body of work appeared in books and scientific journals that are available in libraries and from the publishers.
- There were no activities under the international air pollution provisions (Division 6 of Part 7) of CEPA 1999 during the reporting period.
- There were no activities under the international water pollution provisions (Division 7 of Part 7) of CEPA 1999 during the reporting period.

### Publication in the *Canada Gazette*

In the table headings, "draft Notice," "final Notice" and "draft Order" refer to the publication date in the *Canada Gazette*, Part I, Notices and Proposed Regulations. "Final Order" refers to the publication date in the *Canada Gazette*, Part II, Official Regulations. To learn about the purpose of publication in the *Canada Gazette*, consult the *Canada Gazette* URL provided in Appendix A or contact *Canada Gazette* general inquiries listed in the same appendix.

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# Executive Summary

This Annual Report provides an overview of the results achieved under the *Canadian Environmental Protection Act, 1999* (CEPA 1999) from April 1, 2008, to March 31, 2009.

In 2008–2009, the Minister consulted with the National Advisory Committee on various CEPA 1999 initiatives, and reported on actions under three administrative agreements and one equivalency agreement.

The CEPA Environmental Registry continued to provide public access to all CEPA-related initiatives, with an average of 79 000 visits each month. There were 30 public consultation opportunities published on the Registry in the reporting period.

Results were achieved under six key environmental quality monitoring initiatives, such as the National Air Pollution Surveillance Network, the Canadian Air and Precipitation Monitoring Network and the Northern Contaminants Program. In 2008–2009, Environment Canada and Health Canada scientists published hundreds of articles, reports and papers. Much of this research is carried out in collaboration with other governments, academic institutions and industry, in Canada and abroad. The report provides examples of research activities related to air quality, water, wildlife and human health.

In collaboration with provincial and territorial governments, four environmental quality guidelines for water or soil, and seven drinking water quality guidelines or guidance documents were finalized in the reporting period.

Public reporting continued in 2008–2009 through the publication of Canadian Environmental Sustainability Indicators for air quality, water quality and greenhouse gas emissions; the National Pollutant Release Inventory, which provides a publicly accessible inventory of pollutant releases (to air, water and land), disposals and transfers for recycling; and greenhouse gas reports.

In keeping with CEPA 1999's national goal of pollution prevention, eight pollution prevention planning Notices were in various phases of implementation during the reporting period. Through the Canadian Council of Ministers of the Environment, five pollution prevention awards were presented in 2008–2009 to organizations that have shown leadership and innovation in pollution prevention.

In 2008–2009, significant progress was made on the Challenge program under Canada's Chemicals Management Plan. This program is collecting information on the properties and uses of approximately 200 chemical substances that are potentially harmful to human health or the environment, and are high priorities for action. As of March 31, 2009, requests for information had been launched for 151 substances, and draft or final assessment decisions had been published for 88 of those substances. Of those assessed, 27 substances were declared or proposed to be declared toxic under CEPA 1999, with 3 of those substances slated for virtual elimination. Other types of assessments (draft or final) were conducted on another 163 substances. In total, draft or final assessment decisions were published for 251 existing substances or groups of substances.

Various risk management measures were undertaken in 2008–2009. Eight substances or groups of substances were proposed for addition to Schedule 1 of CEPA 1999 (the List of Toxic Substances). Notices of intent to apply Significant New Activity Notices, which require new and future uses of a substance to be notified and assessed, were published for 13 substances and final Orders were published for 148 substances. These substances are no longer in commerce in Canada but have hazardous properties that could affect the environment or human health if commercial activity resumes. An additional 534 substances were removed from the Domestic Substances List, meaning that these substances are also subject to notification and assessment prior to any manufacture or import. A total of eight regulations were proposed, amended or finalized in 2008–2009. Included were final regulations regarding perfluorooctane sulfonate and its salts

(PFOS), which are found in some water, soil and stain repellents applied to textiles, and polybrominated diphenyl ethers (PBDEs), which are used as flame retardants. Both of these substances were targeted for immediate action under Canada's Chemicals Management Plan.

The Canadian public and environment continued to be protected from the possible risks associated with the introduction of new substances to the Canadian market. The Ministers conducted 492 assessments of new chemicals or polymers. Of the 492 notifications received, the Minister issued 28 Significant New Activity Notices and 10 Ministerial Conditions.

Work on animate products of biotechnology continued in 2008–2009. Guidelines were developed for conducting screening assessments of micro-organisms on the Domestic Substances List. A Technical Expert Group provided advice and recommendations on the process. During 2008–2009, three notifications were received for new animate products of biotechnology and Significant New Activity Notices were published for two of these substances.

Under Part 7 of CEPA, activities in the reporting period related to disposal at sea, and the import and export of hazardous wastes and recyclable materials. In 2008–2009, 96 permits were issued in Canada for the disposal of 3.79 million tonnes of waste and other matter. Most of this was dredged material that was removed from harbours and waterways to keep them safe for navigation. As required by CEPA 1999, monitoring projects were completed on a total of 20 ocean disposal sites in the reporting period.

The Minister implemented the Government's international obligation as a Party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal through CEPA's *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. In calendar year 2008, imports and exports of these materials were 509 501 and 457 806 tonnes, respectively.

Under the *Environmental Emergency Regulations*, a total of 5400 facilities had filed Notices of Identification of Substance and Place as of March 31, 2009. In addition, 2332 facilities have filed notices indicating that they have prepared and implemented environmental emergency plans.

Promoting compliance with and enforcing CEPA's regulations continues to be a priority. In 2008–2009, the total number of designated CEPA enforcement officers was 167, including 37 officers from the Environmental Emergencies Program. Numerous training programs were developed and implemented. The report also provides examples of the numerous compliance promotion projects undertaken by regional offices to increase the awareness and understanding of the law and its regulations, such as collaboration with First Nations and workshops on individual CEPA 1999 regulations. Enforcement Officers conducted more than 4600 inspections during the reporting period, and more than 75 investigations were in various stages of development. Enforcement measures included 145 Environmental Protection Compliance Orders, among other measures.

# 1 Administration (Part 1)

Part 1 of CEPA 1999 requires the Ministers to establish the National Advisory Committee, composed of one representative for the federal Minister of the Environment and one for the federal Minister of Health, representatives from each province and territory, and not more than six representatives of Aboriginal governments from across Canada.

Part 1 allows the Minister of the Environment to negotiate an agreement with a provincial or territorial government, or an Aboriginal people with respect to the administration of the Act. Part 1 also allows for equivalency agreements, which suspend federal regulations in a province or territory that has equivalent regulatory standards.

## 1.1 National Advisory Committee

The National Advisory Committee advises the Ministers on actions taken under CEPA 1999, enables national, cooperative action, and seeks to avoid duplication in regulatory activity among governments. The Committee also serves as the single window into provincial and territorial governments, and representatives of Aboriginal governments on consultations and offers to consult.

To carry out its duties in 2008–2009, the National Advisory Committee participated in one face-to-face meeting, eight conference calls, and ongoing correspondence among members throughout the year. Federal initiatives brought to the Committee for discussion included

- implementation of Canada's Chemicals Management Plan including risk assessment and risk management activities for Batches 1 through 9 of the Challenge;
- the federal government's Regulatory Framework for Air Emissions;
- development of motor vehicle fuel efficiency regulations for Canada, and the federal agenda on cleaner vehicles, engines and fuels;
- status of the CEPA 1999 Parliamentary review; and
- other risk management activities, such as developing, amending or repealing regulations; pollution prevention plans; guidelines and codes of practice; proposed options for managing risks to the environment and human health; and other issues related to CEPA 1999.

*www.ec.gc.ca/ceparegistry/gene_info/nac.cfm*

## 1.2 Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem

Since 1971, Canada and Ontario have worked together through the Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem. This agreement, most recently renewed in June 2007, guides the efforts of Canada and Ontario in achieving a healthy, prosperous and sustainable Great Lakes Basin ecosystem for present and future generations and is the mechanism for meeting Canada's obligations under the Canada–U.S. Great Lakes Water Quality Agreement. The Agreement comprises 13 goals, 37 results and 183 specific commitments in four priority areas:

- designated Areas of Concern (AOCs) in the Great Lakes Basin;
- harmful pollutants;
- lake and basin sustainability; and
- coordination of monitoring, research and information.

The Areas of Concern Annex (Annex 1 of the Agreement) comprises two goals: Goal 1 is to complete priority actions for delisting four AOCs (Nipigon Bay, Jackfish Bay, Wheatley Harbour and St. Lawrence River, Cornwall). In 2008–2009, remedial actions in the four Goal 1 AOCs neared completion with the main outstanding actions for delisting being upgrades to sewage treatment plants in the Nipigon and St. Lawrence areas. The objective of Goal 2 is to make significant progress toward Remedial Action Plan implementation, environmental recovery and restoration of beneficial uses in the remaining 11 AOCs. Work carried out included the cleanup of contaminated sediment,

the establishment and advancement of contaminated sediment management strategies, and the delivery of habitat restoration strategies and projects to restore beneficial uses.

The Harmful Pollutants Annex (Annex 2 of the Agreement) addresses both past (legacy) and ongoing sources of pollution in the Great Lakes Basin. Annex 2 takes a substance and/or sector approach to reducing and preventing releases throughout the basin, and seeks to virtually eliminate persistent bioaccumulative toxic substances. Environment Canada's efforts under Annex 2 include actions undertaken by the Great Lakes Binational Toxics Strategy, which is a collaborative arrangement between Environment Canada and the U.S. Environmental Protection Agency to achieve progress toward the reduction of persistent toxic substances within the Great Lakes Basin. Environment Canada's efforts under Annex 2 also support the delivery of Canada's Chemicals Management Plan.

In 2008–2009, the Great Lakes Binational Toxics Strategy Stakeholders Forum continued its work to reduce emissions and releases to the environment of Level 1 substances, including mercury, polychlorinated biphenyls (PCBs), dioxins and furans, hexachlorobenzene and benzo(a)pyrene. Since the signing of the Strategy in 1997, 13 of the challenge goals established for Level 1 substances by Environment Canada and the United States Environmental Protection Agency have been met. Significant progress has been made toward the remaining four challenge goals. Canada continues to make progress toward reaching the PCB challenge goals outlined in the Strategy, to monitor dioxins in the environment, to investigate dioxin data as available, and to look for reductions in uncontrolled combustion sources such as burn barrels. Canada conducted testing of certified wood stoves to evaluate emission factors and completed a Polycyclic Aromatic Hydrocarbon Source Apportionment Modeling project. Canadian monitoring data indicate declining environmental concentrations of dioxins, furans, coplanar PCBs, benzo(a)pyrene and hexachlorobenze at Ontario sites.

***www.binational.net***

Environment Canada worked to achieve commitments under Annex 3 of the 2007–2010 Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem to restore beneficial uses in open lake waters through Lakewide Management Plan activities. Stakeholders continued to be actively engaged through participation in development and updating of Lakewide Management Plans. Work also continued toward a better understanding of the state and trends in the Great Lakes Ecosystem. Environment Canada worked with universities and other government agencies on many water and wildlife research projects. These included implementing cooperative binational monitoring programs in support of Lakewide Management Plans; drafting a suite of updated indicators for peer review at the 8th biennial State of the Lakes Ecosystem Conference, which it hosted in collaboration with the United States Environmental Protection Agency; and drafting the State of the Great Lakes 2009 Highlights report.

Additionally, information on emerging contaminant monitoring and surveillance efforts in the Great Lakes was gathered through Canada's integrated multi-media approach to toxics monitoring under the Chemicals Management Plan. Canada continued to engage both federal and provincial partners in monitoring, surveillance and research on emerging harmful pollutants. Canadian monitoring data indicate declining environmental concentrations of polybrominated diphenyl ethers (PBDEs) at Ontario sites. Canadian monitoring data also provided a better understanding and insight into the basin-wide distribution of perfluorinated compounds. Canadian scientists continued to conduct research on the identification, prioritization and screening of chemicals in commerce that may be of concern for future assessment, monitoring and surveillance. As the understanding of the sources and extent of the chemical problems increases, different approaches are used to address the problems, such as education.

***www.ec.gc.ca/ceparegistry/documents/agree/Fin-COA07/toc.cfm***

## 1.3 Canada–Quebec Administrative Agreement

The governments of Canada and Quebec agreed to a five-year Administrative Agreement Between the Government of Quebec and the Government of

Canada Regarding the Implementation in Quebec of Federal Regulations Pertaining to the Pulp and Paper and Metal Mining Sectors, which came into force on April 1, 2007. Under the Agreement, the province acts as a "single window," collecting data from pulp and paper mills required by the provincial regulations and federal regulations under the *Fisheries Act* and CEPA 1999, and sending this data to Environment Canada. The relevant CEPA 1999 regulations are the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* and the *Pulp and Paper Mill Defoamer and Wood Chip Regulations*. Both levels of government maintain full responsibility for conducting inspections and investigations, and for taking appropriate law enforcement measures to ensure that industry complies with their respective requirements.

In 2008–2009, Environment Canada examined more than 700 monthly reports from mills, and federal Enforcement Officers conducted inspections at 20 mills. In 2008–2009, the Agreement's Management Committee met twice, on July 17, 2008, and January 29, 2009.

## 1.4 Canada–Saskatchewan Administrative Agreement

The Canada–Saskatchewan Administrative Agreement for the Canadian Environmental Protection Act has been in force since September 1994. It is a work-sharing arrangement covering certain provincial legislation and seven CEPA 1999 regulations, including two regulations related to the pulp and paper sector, two regulations on ozone-depleting substances and three regulations on PCBs.

No prosecutions under these regulations were undertaken in 2008–2009. Activities under the Agreement in 2008–2009 included

- Provincial authorities relayed a total of nine spills of electrical fluids that could have contained PCBs. Corrective actions included the immediate cleanup of the spills, and proper disposal of PCBs and contaminated soils.
- The only mill subject to the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* has been closed and no longer has a continual effluent discharge. Because of rain and runoff, in April, July and September 2008, the mill owners conducted discharges, which were found to be in compliance.
- Environment Canada and the Saskatchewan Ministry of Environment did not conduct any on-site inspections under the *Ozone-depleting Substances Regulations, 1998*; the *Storage of PCB Material Regulations*; or the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*.

***www.mb.ec.gc.ca/pollution/e00s63.en.html***

## 1.5 Canada–Alberta Equivalency Agreement

In December 1994, the Agreement on the Equivalency of Federal and Alberta Regulations for the Control of Toxic Substances in Alberta came into effect. As a result of the Agreement, the following CEPA 1999 regulations, or parts thereof, are no longer applicable in Alberta:

- *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* (all sections);
- *Pulp and Paper Mill Defoamer and Wood Chip Regulations* (sections 4(1), 6(2), 6(3)(*b*), 7, and 9);
- *Secondary Lead Smelter Release Regulations* (all sections); and
- Vinyl Chloride Release Regulations, 1992 (all sections).

There are no longer any operating vinyl chloride plants or lead smelters in Alberta and therefore no compliance issues to report under the *Vinyl Chloride Release Regulations* or the *Secondary Lead Smelter Release Regulations*.

The Canada–Alberta Agreement is currently under review. Until its renewal, Environment Canada and Alberta Environment continue to work together in the spirit of the Agreement.

Alberta Environment indicated that there were no reported violations by the four pulp and paper mills regulated under the pulp and paper regulations in 2008–2009.

***www.mb.ec.gc.ca/pollution/e00s61.en.html***

# 2 Public Participation (Part 2)

Part 2 of CEPA 1999 outlines public participation requirements under the Act, including the establishment of an environmental registry, whistleblower protection, and the right of an individual to request an investigation and pursue court action.

## 2.1 CEPA Environmental Registry

The CEPA Environmental Registry was launched on Environment Canada's website with the proclamation of CEPA 1999 on March 31, 2000. Since that time, ongoing efforts have been made to increase the Registry's reliability and user-friendliness. The structure of the Registry continued to evolve during the reporting period, as new documents were added and as improvements were suggested by users.

Figure 1 shows that from 2007–2008 to 2008–2009, there was a reduction in the number of visitors to approximately 79 000 per month, a decrease from 163 000 in the previous year. The content of the Registry continues to expand to serve Canadians better and now encompasses thousands of CEPA-related documents and references. It has become a primary source of environmental information for the public and private sectors, both nationally and internationally, and has been used as a source of information in university and college curriculums.

In 2008–2009, the Registry (ceparegistry@ec.gc.ca) received more than 250 requests for CEPA-related information. Many of these requests were for information on the assessment reports of Batches 3 and 4 substances under the Chemicals Management Plan Challenge. Other requests involved pollution prevention plans, proposed regulations, guidelines, import of chemicals, biotechnology, permits and the Domestic Substances List. There was one Notice of Objection filed in 2008–2009.

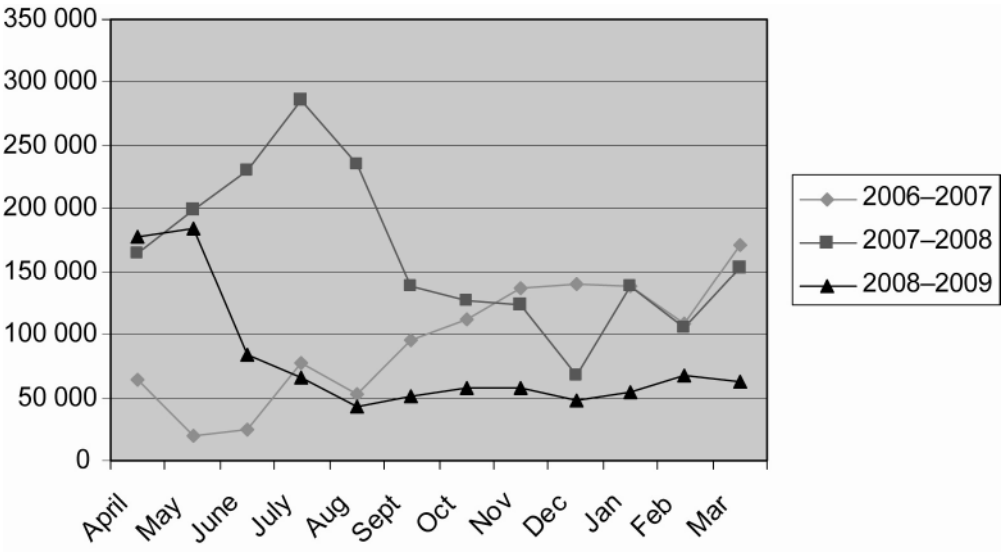
*www.ec.gc.ca/ceparegistry*

## 2.2 Public Consultations

In 2008–2009, there were 30 opportunities posted on the Environmental Registry for stakeholders and the public to consult. This is the average number usually posted within a given year.

*www.ec.gc.ca/ceparegistry/participation*

**Figure 1. Visitors to the CEPA Environmental Registry, by month, from 2006–2007 to 2008–2009**



# 3 Information Gathering, Objectives, Guidelines and Codes of Practice (Part 3)

Part 3 of CEPA 1999 requires the Minister of the Environment to issue environmental quality objectives and guidelines, release guidelines and codes of practice. Under this Part, the Minister of Health is also required to issue objectives, guidelines and codes of practice with respect to the elements of the environment that may affect the life and health of the people of Canada. Part 3 also provides for research, information gathering, the creation of inventories and reporting.

## 3.1 Environmental Quality Monitoring

In Canada, air and water quality monitoring is carried out through partnerships among provincial, territorial and federal governments; municipalities; universities; air and water associations; environmental groups and volunteers.

### 3.1.1 National Air Pollution Surveillance Network

The National Air Pollution Surveillance (NAPS) network is a joint federal, provincial, territorial and municipal network established in 1969. It is primarily an urban network, with nearly 300 air monitoring stations located in 177 communities. In total, almost 840 instruments, including continuous analyzers, particulate matter monitors and samplers, are used to provide air quality measurements for criteria air contaminants and toxic substances. These include polycyclic aromatic hydrocarbons, dioxins and furans, which are produced through combustion like wood burning, as well as heavy metals, such as arsenic, lead and mercury. In all, more than 340 types of chemicals are analyzed in samples collected at typical urban NAPS sites, including more than 167 volatile organic compounds that contribute to smog formation. Over the years, the network has produced one of the longest and most geographically diverse air quality databases with the largest number of pollutants in Canada.

NAPS data are used to report on progress toward achieving the Canada-wide Standards for Particulate Matter (PM) and Ozone. Ozone and fine particulate matter data are used by the Canadian Environmental Sustainability Indicators program for its air indicator, while the Canada–U.S. Agreement on Air Quality uses data for discussions relating to transboundary pollution. Sulphur dioxide, nitrogen dioxide, ozone, fine particulate matter and carbon monoxide measurements through the NAPS network are also used by Alberta, Ontario and Quebec to report on their Air Quality Index, and by Environment Canada and the remaining provinces to report on the Air Quality Health Index. A large number of requests for NAPS data are received each year by Environment Canada from other governments, academic researchers and Canadians.

In 2008–2009, Environment Canada continued to add new sites and provide analytical support to the network to improve the capacity to provide information on urban air quality and the human health impacts of local emissions. In 2009, NAPS celebrated its 40th anniversary. An informational brochure providing trends data was produced to distribute to stakeholders and the public.

Since 1970, lead and sulphur dioxide concentrations, and particulate matter levels have decreased by 90%, 96% and more than 50%, respectively, in ambient air. In addition, urban benzene concentrations decreased by 76% between 1991 and 2008, while rural benzene concentrations decreased by 50% between 1994 and 2008. These changes to ambient pollutant levels resulted from the implementation of environmental regulations and fuel standards that addressed concerns about the impact of these substances on the health of Canadians. While concentrations of major pollutants have decreased in the last 40 years, ongoing measurements and research on health effects have made it apparent that pollutants, such as fine particulate matter (smaller than 2.5 microns) and ozone, are still of concern. New chemicals are also identified for regulation based on health or environmental risks. As these new priorities are identified, NAPS

implements methods and procedures to collect data on these chemicals. This process results in a continuously evolving measurement program to track relevant critical air contaminants. Environment Canada is developing and implementing analytical methods to address the atmospheric science knowledge gaps linked to the changing characteristics of the volatile and semi-volatile chemicals emitted in ambient air from new vehicle engines that are fitted with novel emission control technologies and use a wide array of conventional and renewable fuels.

*www.etc-cte.ec.gc.ca/naps/index_e.html*

### 3.1.2 Canadian Air and Precipitation Monitoring Network

The Canadian Air and Precipitation Monitoring Network is a regional/remote monitoring network that has been measuring air quality since 1978. There are currently 30 measurement sites in Canada, located in rural areas to provide a representative sampling of regional air quality. One site in the United States and another in Canada ensure the comparability of measurement methods between the two countries. The network measures a wide range of air pollutants, including several toxic substances under CEPA 1999 (e.g. particulate sulphate, gaseous ammonia, nitrate, gaseous sulphur dioxide and nitric acid).

In 2008–2009, more than 25 000 samples of all types were analyzed in support of Canadian environmental research initiatives. New sites and additional analytical capacity were added to increase the capacity of the network to define the impacts of domestic and international air pollutant emissions on air quality, human health and the environment.

*www.msc-smc.ec.gc.ca/natchem/particles/n_capmon_e.html*

### 3.1.3 Integrated Atmospheric Deposition Network

Mandated by Annex 15 of the Great Lakes Water Quality Agreement, the Integrated Atmospheric Deposition Network is a binational venture involving Canadian and U.S. agencies that was established in 1990 to monitor trends of non-point priority toxic pollutant sources in the Great Lakes Basin.

The network maintains a monitoring station on the shoreline of each of the five Great Lakes along with several additional satellite stations. The monitoring stations provide long-term data on regionally representative concentrations of toxic substances in gas, particle and precipitation samples. Environment Canada operates stations on Lake Huron at Burnt Island and on Lake Ontario at Point Petre. Substances monitored included polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides, including those banned and in-use, congener-specific PCBs and trace elements. PBDEs were added in early 2008 after the network was realigned with Canada's Chemicals Management Plan.

In 2008–2009, emphasis was placed on continued measurements of priority toxic substances, data analysis, and development and refinement of methods. An international peer review of the Integrated Atmospheric Deposition Network program took place in November 2008 at the Society of Environmental Toxicology and Chemistry conference, and the related reports were published in 2008. A final report including recommendations for the Integrated Atmospheric Deposition Network from the peer review panel was received.

*www.msc-smc.ec.gc.ca/iadn/index_e.html*

### 3.1.4 Northern Contaminants Program

Environment Canada continued atmospheric measurements of persistent organic pollutants (POPs) and other priority chemicals in the Arctic through the Northern Contaminants Air Monitoring: Organic Pollutant Measurements project, under the Northern Contaminants Program. Led by Indian and Northern Affairs Canada, the Northern Contaminants Program is Canada's National Implementation Plan for the Arctic Monitoring and Assessment Programme and contributes to Canada's obligations under the United Nations Environment Programme's Stockholm Convention on Persistent Organic Pollutants.

In 2008–2009, data on long-term trends and a circumpolar assessment of spatial distribution of POPs contributed to the first Global Monitoring

Report of the Stockholm Convention. The data also formed the basis of a ministerial report to the Arctic Monitoring and Assessment Programme presented in January 2009. Air concentration data on new priority chemicals, including perfluorinated compounds and current-use pesticides, measured at Alert since 2006, started to become available in 2008–2009 with the support of Canada's Chemicals Management Plan. This is the first attempt to measure these chemicals at a High Arctic station, with the goal of continuing the measurements in order to assess temporal trends. A newly developed flow-through passive air sampler has been tested at Alert since September 2007, and testing is ongoing. It was designed specifically for use in remote regions without electricity, and it can sample large volumes of air relatively quickly. This sampler has the potential to meet the increased demand for more spatially resolved long-term trend data on atmospheric POPs in the Arctic; these are needed to assess the effectiveness of the Stockholm Convention.

In 2008–2009, the project to provide atmospheric measurements of mercury continued to deliver data about atmospheric mercury levels and processes in the Canadian Arctic. The work conducted through this project provides crucial information about key atmospheric transport, transformation and deposition processes of this priority pollutant in the Arctic.

***www.ainc-inac.gc.ca/nth/ct/ncp/index-eng.asp***

### 3.1.5 Intercontinental Atmospheric Transport of Anthropogenic Pollutants to the Arctic

This project is one of 44 Canadian-funded projects and one of 5 projects led by Environment Canada's scientists under the International Polar Year, which is a large, global, interdisciplinary scientific program focused on the Arctic and the Antarctic. The project measures POPs and mercury air concentrations simultaneously in potential source regions along the Pacific coasts and in the Canadian, American and Russian Arctics. This project is an extension of the Northern Contaminants Program's networks for measurement of atmospheric POPs and mercury. It is a collaboration of a team of scientists from six countries, namely Canada, Russia, the United States, China, Vietnam and Japan.

In Canada, POPs and mercury are measured at stations in Alert, Nunavut, and Little Fox Lake, Yukon. Mercury in air is also measured at Whistler, British Columbia, where measurements took place between summer 2007 and spring 2008 and will continue until spring 2010. Early results show air carrying PCBs from different source regions on different days to the Little Fox Lake measurement site. Researchers are detecting, for the first time, a decrease in annual atmospheric mercury concentrations at the Alert site. This project was also featured in a youth-generated exhibit, *On Thin Ice – Youth Respond to International Polar Year*, at the Ontario Science Centre, Toronto, from 2008 to 2009.

***www.ec.gc.ca/api-ipy/default.asp?lang=En&n=8EBD7558-1***

### 3.1.6 Global Atmospheric Passive Sampling Study

The Global Atmospheric Passive Sampling Study is a global network for monitoring chemicals in the environment using simple sampling devices that require no electricity. The network builds on a successful two-year pilot study that was initiated in December 2004 at more than 50 sites located on all seven continents. It is a collaborative effort managed by Environment Canada scientists working with a team of international researchers. The results of the study contribute to Canada's obligations pursuant to the Stockholm Convention on Persistent Organic Pollutants under the United Nations Environment Programme, and the Protocol on Persistent Organic Pollutants under the United Nations Economic Commission for Europe.

In 2008–2009, data from the network contributed to the first global monitoring report of the Stockholm Convention on Persistent Organic Pollutants, which was to be presented at the Conference of the Parties in Geneva in May 2009. The Global Atmospheric Passive Sampling Study measurements were the only available data for air for some regions and provided invaluable baseline information that will be used to assess effectiveness of control measures. Quarterly sampling at 55 global sites continued in 2008–2009, the fourth sampling year for this network. Progress was also made on screening efforts to identify priority pollutants

associated with the Chemicals Management Plan in archived samples.

*www.msc-smc.ec.gc.ca/gaps*

## 3.2 Research

Environment Canada and Health Canada scientists published hundreds of articles, reports and papers during this reporting period. The following examples illustrate the types and range of research undertaken in 2008–2009.

### 3.2.1 Air

#### 3.2.1.1 Air Quality Research in Support of the Clean Air Regulatory Agenda

Air quality research supported by the Clean Air Regulatory Agenda provides coordinated, timely, credible and relevant information to Canadians and decision-makers about the health risks and environmental impacts of current and future levels of air pollutants through research, monitoring, modeling and scientific assessment.

The program primarily focuses on the pollutants responsible for smog, acid deposition and mercury pollution (e.g. sulphur dioxide, nitrogen oxides, volatile organic compounds, particulate matter, ozone and mercury).

Information derived from this program also enables Canada to track the effectiveness of measures to improve air quality, such as those implemented under CEPA 1999; the Canada-wide Standards for particulate matter, ozone and mercury; the Canada–United States Air Quality Agreement; and the United Nations Economic Commission for Europe's Convention on Long-range Transboundary Air Pollution.

Activities under the program in 2008–2009 included

- The scientific integrity and scope of the long-term environmental target for acid deposition mitigation in Canada (i.e. zero exceedances of critical loads) were improved. New information from western Canada and updated information for parts of eastern Canada were integrated into critical load maps for acid deposition.
- The adequacy of current targets to promote recovery of aquatic ecosystems from acid deposition was assessed by monitoring chemical and biological responses of lakes to reductions in acidifying emissions.
- Understanding of exposure of human populations to criteria air pollutants in southwestern Ontario was increased as a result of the completion of sophisticated analyses of air quality data.
- Understanding of the factors governing the transport of ground-level ozone and the sources and composition of particulate matter in ambient air was improved as a result of the collection of new measurements.
- Understanding of exposure of human populations to pollutants from specific sources was improved as a result of new measurements of criteria air pollutants in urban areas.
- Understanding of the scale and scope of mercury pollution in Canada was improved as a result of the initiation of new field studies.
- New features were added to an air quality model (AURAMS) to improve its capacity to accurately predict future air quality in response to changes in air pollutant emissions and climate.
- Understanding of the source–receptor relationships between air pollutant emissions and ambient concentrations of fine particulate matter was improved as a result of source apportionment studies conducted for five Canadian cities and two rural areas: receptor modeling and supporting analysis were applied to measurement data collected from the National Air Pollution Surveillance Network's fine particulate matter speciation program.

#### 3.2.1.2 Air Quality Research in Support of the Chemicals Management Plan

Research studies that were undertaken in support of the Chemicals Management Plan in 2008–2009 included

- Investigations were initiated on the levels of perfluorinated chemicals, PBDEs and other emerging chemicals in air and related media to help advance the sampling and analytical

techniques for these compounds. Work continued on the first international study investigating different sampling techniques for measuring perfluorinated chemicals. Air samples were collected at a background field site in Germany continuously over a one-year period (April 2007 to April 2008) using both active high-volume samplers (continuous, two-week sample periods) and passive samplers. The inter-comparison study involved Environment Canada, and three groups from Germany and the United Kingdom. Results show good consensus for target compounds among participating laboratories as well as good agreement for results on perfluorinated chemicals for air samples collected by active and passive air samplers.

- In collaboration with researchers at the University of British Columbia, the University of Alberta and Health Canada, the Chemicals, Health and Pregnancy Study was initiated to assess human exposure to perfluorinated chemicals and PBDEs, and links to effects on maternal hormone levels. Environment Canada scientists focused on the analysis of target compounds in indoor and outdoor air samples, dryer lint and house dust employing a disk passive sampler technique, developed in-house, to collect air samples from 59 homes. Analysis of target chemicals has been completed, allowing for the reporting of ionic perfluorinated chemicals for the first time in indoor/outdoor air. Publications are in preparation (www.cher.ubc.ca/chirp).
- An atmospheric modeling study shows that toxic POPs migrate from their sources in warm latitudes to the Arctic at a high elevation of atmosphere. In higher atmospheric levels, lower air temperatures increase the residence times of the chemicals and stronger winds deliver them more efficiently to the Arctic.
- The robustness of the long-term trends in concentrations of legacy and currently used pesticides in the air over the Great Lakes was examined. Inter-annual variation in the concentrations of airborne pesticides exhibited a good association with climate—the North Atlantic Oscillation and El Niño – Southern Oscillation. For legacy pesticides (e.g. alpha-hexachlorocyclohexane), after removing their long-term decline trend driven by their degradation in air and soils, strong climate influences were demonstrated through this time-series research.
- Currently used pesticides and legacy organochlorine pesticides are being measured in air and water of the Canadian archipelago. Following expeditions to the western archipelago off Banks Island in May and July 2008, compounds identified in air and/or water were chlorpyrifos, dacthal, chlorothalonil, pendimethalin, trifluralin, endosulfan, chlordane, hexachlorocyclohexanes, heptachlor epoxide and dieldrin. Calculations show that the atmosphere is a source to water for currently used pesticides (i.e. air-to-water transfer dominates), whereas the legacy pesticides are experiencing net water-to-air transfer (i.e. water is the source to air) or a more balanced air-water exchange that occurs in both directions. Other research on currently used pesticides is being conducted in Ontario streams and the Great Lakes.
- Research continued to determine aging effects on soil–air exchange of POPs, and development of analytical methods for chiral brominated flame retardants. The bioavailability of POPs in soil has been found to decrease with residue age. Research is examining decreased aeroavailability, or increased binding to soil, as the chemical ages.
- In collaboration with National Research Council scientists, a study was initiated to establish new analytical approaches for “fingerprinting” and monitoring silver isotopes in environmental samples. This new analytical technique has recently emerged as the leading method for describing transport and transformation processes of elements in nature.
- Development continued on a method for analyzing platinum-group elements in environmental samples resulting from their use as main active components in automotive catalytic converters. Initially, it was believed that the emitted elements remained in the roadside environment, but recent studies have shown that fine particles containing platinum-group elements can be transported and distributed at regional and long-range levels.

- Research continued on a method for analyzing rare earth elements (including most of the lanthanide and actinide series) in environmental samples, as rare earth elements are excellent tracers of specific industrial emission sources. These include petroleum-refining operations that use fluidized-bed catalytic cracking processes, and oil-burning sources such as oil-fired power plants.

### 3.2.2 Water

#### 3.2.2.1 Pesticides

Research studies on pesticides in 2008–2009 included

- Research was conducted to examine the use of short-term *in situ* (caging in the field) exposures using a sensitive freshwater crustacean (*Hyalella azteca*) as a tool to predict long-term effects of current-use pesticides in aquatic ecosystems. Results showed significantly decreased survival and acetylcholinesterase activity (an enzyme that is inhibited by organophosphate and carbamate insecticides) after one-week exposures to streams in the Niagara region of southern Ontario. Data revealed that organophosphate and carbamate insecticides were detected in the surface waters at these sites.
- Previous monitoring studies across the three Prairie provinces indicated that seven herbicides (2,4-D, MCPA, dicamba, clopyralid, bromoxynil, dichloroprop and mecoprop) were found in prairie aquatic ecosystems. Research was conducted on the effects of a mix of seven herbicides, including glyphosate (one of the most popular herbicides used in Canada today), on attached and free-living wetland microbial communities in four prairie wetlands. These experiments were conducted on wetlands that had markedly differing salinities. Several molecular and physiological approaches were used to assess the effects and risks associated with this herbicide mixture, using complex microbial communities as indicators. Results of this study indicate that this herbicide mixture has the potential to affect energy cycling in prairie wetlands. As well, preliminary results indicate that effects of the herbicide mixture may be dampened considerably in very saline ponds. Therefore, highly saline ponds may not be as vulnerable to herbicide effects as freshwater ponds.

#### 3.2.2.2 Metals

Research studies on metals in 2008–2009 included

- Research was undertaken on models to predict effects of mixed metals. A metal effects addition model, which was developed to predict the chronic toxicity of mixtures of metals in environmental samples to an aquatic invertebrate (*Hyalella azteca*), was tested at 34 sites across Canada.
- The bioavailability and toxicity of zinc from sediments with different chemistries were determined for four aquatic invertebrates (*Hyalella azteca*, *Chironomus riparius*, *Hexagenia* spp., and *Tubifex tubifex*) to derive sediment quality guidelines. Research on the bioaccumulation and toxicity of uranium in an amphipod (*Hyalella azteca*) from artificially spiked and naturally contaminated sediments was completed. The relative contribution of cadmium from food and water to bioaccumulation and toxicity was determined in an amphipod (*Hyalella azteca*). The impact of the cadmium source (food or water) on the toxic endpoint (e.g. survival, growth or reproduction) was determined.

#### 3.2.2.3 Municipal Wastewater Effluents

Research studies related to municipal wastewater effluents that were undertaken in 2008–2009 included

- Fathead minnows (*Pimephales promelas*) were exposed for one complete lifecycle to municipal wastewater effluent from the Hamilton Woodward plant to identify the effects on fish reproduction. Exposed fish grew well but produced fewer eggs than control fish. Analyses of municipal wastewater effluent showed the presence of several pharmaceuticals and personal care products. The highest pharmaceutical concentration was the diabetes drug metformin at 70 µg/L. Other products detected above 500 ng/L were

codeine, naproxen, clarithromycin, ranitidine, ibuprofen, triclosan and azithromycin.

- Research evaluated the effects of municipal wastewater effluents on reproductive development of wild fish populations in Canada, and whether any impacts influenced the survival of fish populations and altered the fish community structure. The Grand River, Ontario, was selected for these studies, as it is one of the most highly impacted river systems in the country by municipal wastes. Wascana Creek in Regina was also selected, as during the winter low-flow periods, the creek is almost 100% treated sewage. This creek does not receive any other major discharges, making it a simpler model system to understand. As well as examining impacts on fish growth and survival, detailed tests on how the effluent affected the reproductive potential of fish were performed, as previous studies have shown effects in other countries at high effluent concentrations.

  Studies in the Grand River in 2007 demonstrated increases in fish abundance and diversity downstream of wastewater effluent discharges, when compared with reference fish communities with similar habitat characteristics. However, 2008 observations were significantly different from those of 2007. The 2008 fish community assessment demonstrated decreases in the diversity of fish species and abundance immediately downstream of the wastewater discharges. As sampling continued further downstream, species diversity gradually increased until the next wastewater discharge was reached, where species diversity would again drop downstream of the discharge. This corresponded with an increase in the relative abundance of more tolerant fish species downstream of the wastewater discharges. Water flow rates in the Grand River in 2007 reflected the drought situation in southern Ontario, and the 2008 flow rates reflected the near record rainfall for the region. These differences in flow rates between years could contribute to the differences in fish abundance and species diversity observed between sampling periods. Extremes in water levels can have dramatic impacts on minimum daily dissolved oxygen concentration, habitat availability and effluent dilution.

  Studies in Wascana Creek over the last two years determined that fish populations exist immediately downstream of the sewage discharge in Regina. However, conditions further downstream are unsuitable for fish survival. Detailed studies on reproductive function in fish downstream of the discharge, relative to upstream reference fish, are continuing.
- Investigations were initiated to examine the immune status of wild freshwater mussels chronically exposed to municipal effluents in the Grand River, Ontario. Mussels collected downstream of municipal effluents exhibited significantly higher levels of hemocyte phagocytosis activity (immune response) than those collected from the upstream site. Elevated phagocytosis is known to be induced by metals and elevated bacterial levels, both of which are found in municipal effluents. These data suggest that chronic exposure to municipal effluents results in immune stimulation in wild mussels.

#### 3.2.2.4 Endocrine-disrupting Substances

Research conducted on potential endocrine-disrupting substances in 2008–2009 included

- A study with colleagues from the University of Ottawa was undertaken to determine the impacts of ethinylestradiol on wild fish. Ethinylestradiol, a birth control ingredient, is discharged in wastewaters from municipal sewage treatment plants and is known to cause effects in fish at concentrations found downstream of some wastewater discharges. One of those effects is the stimulation of production (induction) of the egg yolk protein, vitellogenin, in male fish. The conventional wisdom was that ethinylestradiol would pass through fish to be readily excreted in bile, as is the case for natural estrogen. However, the study showed that bottom-feeding wild fish from the impact zone of the St. Clair River bioaccumulate ethinylestradiol. Vitellogenin is also induced in male fish from the same zone. Neither effect was observed in fish from the reference site. Ethinylestradiol is associated

primarily with municipal sewage treatment plant effluents, which suggests that the Corunna sewage treatment plant is the likely cause of the observed estrogenic responses in wild fish from the Stag Island area of the St. Clair River. Stable isotope analysis suggests that ethinylestradiol bioaccumulation is a result of eating prey containing ethinylestradiol. This is the first report of the bioaccumulation of the pharmaceutical ethinylestradiol in wild fish.

- Sediments at Randle Reef, Hamilton Harbour, are highly contaminated with PAHs and metals, as well as various other contaminants. Studies there have demonstrated adverse effects in fish, including elevated mortalities and increased incidences of tumours. However, reproductive effects and genetic alterations that could be inherited by future generations of fish have not been evaluated. This study exposed sub-adult fathead minnows (*Pimephales promelas*) to contaminated water and sediments at Randle Reef, Hamilton Harbour, using two approaches. In the first, fish were caged at Randle Reef for six weeks. In the second, fish were exposed in the laboratory to whole sediments for three weeks. Fish from both studies were transferred to clean aquaria and evaluated for reproductive impairment immediately following exposure. The study also determined germline mutation rates in fish exposed in the laboratory, using microsatellite DNA markers. Overall, no evidence was found to support the initial expectation that fish exposed to the highly contaminated sediments at Randle Reef would experience elevated germline mutations and reproductive impairment. This finding was unexpected, given the large number of studies that have reported effects following exposure to PAHs and PAH-contaminated sediments, including sediments contaminated with coal tar.

The study also exposed juvenile rainbow trout (*Oncorhynchus mykiss*) to the Randle Reef sediments in the laboratory and explored the effects of the sediment-borne contaminants on differential gene expression. More than 140 genes were isolated that were up- or down-regulated in the sediment-exposed fish compared with reference fish. The isolated mRNAs were cloned, sequenced and compared with nucleotide sequences from databases of known fish genes. Over 60 of the mRNA segments isolated were known fish genes important in the response to stressors.

#### 3.2.2.5 Chemicals Management Plan

Research studies undertaken in support of Canada's Chemicals Management Plan in 2008–2009 included

- Juvenile rainbow trout (*Oncorhynchus mykiss*) were exposed to the flame retardant tetrabromobisphenol-A bis (2,3 dibromopropylether) under flow-through conditions. This study established the solubility of this substance under the test conditions, developed an extraction method and confirmed the waterborne concentration of the test substance.
- A method was developed for the synthesis of 3-monochloro, 5-monochloro and 3,5-dichloro derivatives of triclosan. Triclosan, an antifungal compound, has been linked to a wide range of health effects and is often detected in the aquatic environment.
- A method was developed for the synthesis of mono, di, tri and tetrachloro derivatives of bisphenol A. Bisphenol A, a component in some plastic products, has been shown to pose a risk to the environment and human health.
- Fathead minnow (*Pimephales promelas*) embryos were exposed to two dyes used in Canadian commerce: Acid Blue 80 and Disperse Yellow 7. Results showed an interesting pattern of no effect in eggs or newly hatched larvae, but lethality to four-day-old fry. This delayed mortality has implications for the lengths of exposures in regulatory fish bioassays. Results will be assessed in collaboration with measurement of environmental concentrations of these dyes in Canadian wastewaters to determine whether dye levels in the Canadian environment pose a threat to biota.
- Research on perfluorinated chemicals in the aquatic environment focused on the geographic breadth of contamination and levels of exposures. Perfluorinated chemicals were found at parts per trillion concentrations throughout the Arctic with higher concentrations near rivers and estuaries. An initial survey of Canadian rivers and streams was completed

and accepted for publication in the *Water Quality Research Journal of Canada*. This survey showed that perfluorooctanesulfonic acid and perfluorooctanoic acid were the major perfluorinated compounds present, and that highest concentrations were found in tributaries of Lake Erie and Lake Ontario, and in the St. Lawrence River downstream of Montréal.

- Studies on the long-range transport and physical-chemical properties of cyclic siloxanes were conducted, and a method was developed for trace analysis of these substances. The analysis is challenging because of the ubiquitous use of silicone-based chemicals in consumer and industrial products. Preliminary results showed low levels of cyclic siloxanes in Arctic air samples collected at Resolute Bay, Nunavut, confirming the potential of these compounds to undergo long-range transport.
- Lake sediment cores, glacial ice cores and surface waters from the Arctic were collected and analyzed for new or emerging organic chemical contaminants that are a priority for screening and assessment under CEPA 1999. The use of samples from the Arctic allows for assessment of the potential for remote environments to become contaminated. Brominated flame retardants were found to be prominent contaminants in remote Arctic lakes and on the Devon Island ice cap. Among the flame retardants detected, the predominant chemical was decabromodiphenyl ether, a widely used flame retardant. It was recently proposed that this chemical be declared "toxic" according to CEPA 1999. Concentrations of decabromodiphenyl ether were found to be increasing both at the ice cap (1995–2008) and in recent (post-1990) lake sediments. Brominated flame retardants were also detected in seawater in Barrow Strait (Lancaster Sound) and Rae Strait (near Gjoa Haven) at parts per quadrillion concentrations. Currently used pesticides (endosulfan, chlorthalonil and dacthal) were detected at low part per trillion concentrations in the Devon ice cap and in seawater samples.
- The extent of groundwater contamination discharging to surface water was studied in three urban streams to test a new sampling method involving direct sampling below the stream bed. The sites were located in Angus, Ontario; Amherst, Nova Scotia; and Halifax, Nova Scotia. All three locations had a known plume of groundwater containing chlorinated solvents heading to the streams, which allowed for testing of the screening methodology. The known chlorinated solvent plume was detected at each location and roughly delineated.
- Methods were developed to determine the presence of polybrominated-chlorinated biphenyls in fish. These chemicals can be formed through the combustion of brominated flame retardants in the presence of chlorine, and also during municipal waste incineration. Analysis of samples of Lake Ontario fish showed that several polybrominated-chlorinated biphenyls were present at part per trillion levels. These compounds have not been reported previously in North American samples. Follow-up studies are planned because the biological effects of these chemicals may be similar to those of PCBs as well as chlorinated dioxins and furans.
- Development of methods for the chemical detection in the environment of Chemicals Management Plan medium-priority compounds (anthracenedione dyes and azo dyes) and emerging compounds (such as antibiotics) was a key activity. Methods were developed to extract and analyze dyestuffs from aqueous matrices (including wastewater effluent) as well as from sediments. In addition, Soxhlet and microwave-assisted methods were developed to determine antibiotics in sediments. Researchers developed a method for measuring low concentrations of propanedinitrile, [[4-[[2-(4-cyclohexylphenoxy)ethyl] ethylamino]-2-methylphenyl]methylene]- (CHPD), a dye that was declared toxic under CEPA 1999 and targeted for virtual elimination. This new method will be used to develop a strategy to ensure that CHPD is virtually eliminated from the environment. Research into the plausibility of using micellar-enhanced ultrafiltration to remove antibiotics from wastewater demonstrated that the ultrafiltration technique significantly improved contaminant removal.

### 3.2.3 Wildlife

#### 3.2.3.1 Substance-specific Research

Substance-specific research in 2008–2009 included

- Monitoring was completed on the long-term temporal and spatial trends of priority toxic chemicals (e.g. perfluoroalkyl compounds and brominated flame retardants) and regulated legacy compounds (e.g. DDT and PCBs) in eggs of fish-eating seabird bioindicator species (e.g. gulls, puffins and cormorants) and in other selected wildlife in the Arctic, Pacific (particularly in the Strait of Georgia) and Atlantic marine environments as well as the St. Lawrence River – Great Lakes ecosystem. Conducted in association with international collaborators, the projects obtained information on the presence, sources, environmental pathways and effects of these compounds on birds and other species, and their food webs. For Great Lakes Herring Gulls (*Larus argentatus*) and their aquatic food web, the results show that perfluoroalkyl compounds and brominated flame retardants are currently in a state of change; depending on the substance, they can show greater or lesser trends in their amount of residues increasing over time. For example increases in PBDE levels have been lower in recent years. At the same time, new generations of contaminant stressors to Herring Gulls are on the rise.
- Analyses were completed of essential and non-essential elements in the livers of polar bears collected from five regions in Canada in 2002, in Alaska between 1994 and 1999, and from the northwest and east coasts of Greenland between 1988 and 2000. The analyses showed that concentrations of most elements in polar bears did not exceed toxicity thresholds, although cadmium and mercury exceeded levels correlated with the formation of hepatic lesions in animals studied in the laboratory. Geographical trends were observed for a number of elements in livers, including mercury.
- Liver activities of major contaminant-metabolizing enzymes and circulating PCBs and PBDEs (and their hydroxylated analogues) were shown to differ in cohorts of captive west Greenland sledge dogs exposed to a control and contaminated diet of minke whale blubber. Dietary, age-related and trans-generational effects were also observed on the fate of various chlorinated and brominated organic contaminants.
- The thyroid hormone transport protein, transthyretin, was isolated, cloned and sequenced, and found to be identical between Herring Gulls (*Larus argentatus*) and Glaucous Gulls (*Larus hyperboreus*). In competitive binding studies with the gull transthyretin and natural thyroid hormones, several environmentally relevant substances and degradation (metabolite) products were found to effectively bind to the transthyretin. This finding suggested that environmentally relevant hydroxide-containing PCB and PBDE congeners, and to a lesser extent PCB and PBDE congeners, have a high potential to be physiologically active in these gull species by disturbing thyroid hormone transport.
- The production and use of non-PBDE brominated flame retardant alternatives have been on the rise. Non-PDBE flame retardants and isomers of the chlorinated flame retardant Dechlorane Plus were detected in eggs collected from 1982 to 2006 from seven Herring Gull (*Larus argentatus*) colonies in the five Great Lakes. Dechlorane Plus concentrations were generally higher after the mid-1990s for all sites. Over the past 25 years, Dechlorane Plus isomers have accumulated in the food web of female Herring Gulls with subsequent transfer during egg formation.
- A study with ringed seals (*Pusa hispida*) revealed that the concentration and pattern of PCBs and the formation of hydroxy and methylsulfonyl PCB metabolites differed between two ringed seal populations. The two populations are contrasted by the degree of contamination exposure (in this case, the highly contaminated Baltic Sea and less contaminated Svalbard areas).
- Studies on the effects and toxicokinetics of selected brominated flame retardants on American Kestrels (*Falco sparverius*) being held in a captive colony were completed. Changes in reproductive success, eggshell thinning and nestling growth were found with dietary or in ovo

exposure. The work is being published in the scientific literature and three graduate students are completing thesis research.

- An ongoing assessment of the impact of methylmercury, lake acidity and related stressors on the breeding success of Common Loons (*Gavia immer*) and other wildlife in eastern Canada continued through studies in Nova Scotia, Quebec, Ontario and western Canada.
- Studies of the toxicity of methylmercury to developing avian embryos are being undertaken for a variety of seabird species to determine the comparative sensitivities of these species to methylmercury exposure and to estimate toxic-effect concentrations.
- Investigations of the relationships between contaminant levels and parasite load in fish-eating birds (e.g. Double-crested Cormorants [*Phalacrocorax auritus*] from the Great Lakes) were continued to improve understanding of how contaminants and parasites may be interacting to affect the health of wildlife.
- Exposure and effects studies of Bald Eagle (*Haliaeetus leucocephalus*) nestlings continued on the Pacific coast of North America. Results showed that exposure of eagles to PCBs and DDT-related compounds was highly influenced by trophic level (level in the food chain) and marine carbon input. However, levels of brominated flame retardants did not appear to be influenced by trophic level, perhaps suggesting some capability of the animals to metabolize those chemicals.
- A collaborative study with colleagues in Wales showed that American (*Cinclus mexicanus*) and European populations of Dippers were exposed to different patterns of persistent contaminants. Exposure of American Dippers to PCBs and brominated flame retardants was substantially greater as a result of their feeding on juvenile salmon, compared with the invertebrate diet of their European counterpart.

#### 3.2.3.2 Methodology

Research on analytical methods in 2008–2009 included

- A collaborative study with Norwegian and Faroese scientists was carried out to investigate whether biochemical markers in free-ranging Northern Fulmars (*Fulmarus glacialis*) are related to organochlorine levels. There were significant correlations between one of the biomarkers and most of the organochlorine groups in the Canadian birds studied.
- Tree Swallow (*Tachycineta bicolour*) colonies were established at reference and test sites, and methods were selected and refined for wildlife sampling and standard toxicity testing. The methods established will be used for undertaking long-term studies to identify and assess the occurrence and ecological effects of chemicals found in sewage treatment plant effluents using selected wildlife indicators.
- Laboratory analyses of fatty acids in birds and other wildlife continued. Ecological tracers such as fatty acids were used in combination with other methods (e.g. stable isotopes) to assess how contaminants, nutrients and pathogens are being transferred to wildlife through food webs. This approach provided insight into sources of emerging contaminants (e.g. brominated and fluorinated chemicals) and into the factors regulating exposure to these chemicals in wildlife.
- Work continued on use of river otter (*Lontra canadensis*) feces as a non-intrusive sampling method, and was expanded to include DNA-genotype measurements, thus allowing the identification of individual otters. Combining DNA and contaminant measurements of scats permitted assessments of otter movement over time and space as well as an assessment of population characteristics. Results have been shared with federal contaminated sites managers, and further studies are under way to determine whether Victoria harbour, and possibly Vancouver harbour, populations are impacted by residual contamination of harbour sediments.
- Work continued to establish and validate new methods based on analyses of gene expression combined with cultures of neuronal and other tissue types from wild and domestic birds. These new methods aim to assess toxicity of commercial industrial contaminant mixtures, and various individual congeners of polybrominated diphenyls and other priority substances.

### 3.2.4 Human Health

The following human health studies have contributed or will contribute to risk assessments of chemical substances.

#### 3.2.4.1 Exposure and Biomonitoring

Research on exposure and biomonitoring in 2008–2009 included

- The Canadian Health Measures Survey is a national survey carried out by Statistics Canada, in collaboration with Health Canada and the Public Health Agency of Canada, to collect information from Canadians about their health. The survey includes a biomonitoring component to measure human levels of environmental chemicals in a sample that represents the overall Canadian population. A total of 5600 randomly selected Canadians aged 6–79 were tested at 15 collection sites. Blood and urine specimens were collected from the participants and analyzed for a number of substances. This survey will provide baseline data to track trends and allow for comparisons with sub-populations in Canada and with other countries. The results will also help to focus future research efforts on the links between exposure and health, and provide information to guide action by governments. Biomonitoring data from the first cycle of the survey, conducted from 2007 to 2009, will be released in July 2010. The second cycle of the survey is currently under way and includes children aged 3–5.
- Two migration studies were conducted on bisphenol A. The first migration study, completed in March 2008, investigated selected brands of polycarbonate baby bottles. The test results were considered in the final screening assessment report for bisphenol A released in October 2008. The second migration study in September 2008 evaluated selected brands of non-polycarbonate baby bottles and baby bottle liners, and the test results were published in a peer-reviewed journal in June 2009. Bisphenol A has also been measured in house dust samples through the Health Canada Canadian House Dust Study.
- A national survey of contaminants in Canadian drinking water is under way. This three-year study is examining levels of disinfection by-products, both new and regulated, and selected emerging contaminants in Canadian drinking water. Sixty water treatment plants and distribution systems are being sampled across Canada. More than 100 water quality parameters and contaminant concentrations are being determined for each location. The results will provide updated exposure data to be used in the preparation and update of the *Guidelines for Canadian Drinking Water Quality*.
- Studies are under way on dermal absorption of substances being assessed under the Chemicals Management Plan. Skin is a major route of entry to the human body for many substances, especially those in consumer products such as cosmetics. As a result, it is important to understand how chemicals are transported from the outer surface of the skin to internal layers and blood circulation. This knowledge is especially important when trying to determine what types of chemicals Canadians are exposed to, and how these may affect human health. This project is establishing routine test methods to measure the dermal absorption of chemicals that have been identified as having a priority for human health, which will allow for more accurate estimates of exposure levels.
- A national indoor air survey of chemicals is measuring selected priority chemicals in Canadian residential indoor air. Indoor air samples are being collected and analyzed in a randomly selected national sample of Canadian homes, whose occupants are participating in the Canadian Health Measures Survey. At the same time, outdoor (ambient) air concentrations from selected major cities and rural areas are being determined in the sampling sites of Environment Canada's National Air Pollution Surveillance Network to generate baseline information for target chemicals in these areas.
- Research is under way to examine dietary exposure estimates of young children to emerging POPs and plasticizers. Foods frequently consumed by infants and young children are being analyzed for contaminants, including perfluorinated compounds, PBDEs

and bisphenol A. The outcomes of this study will complement other ongoing Health Canada biomonitoring projects that are measuring the same chemicals in blood and human milk. This study will provide needed information on children's exposure to more short-lived contaminants that are rapidly excreted, such as bisphenol A, whose long-term exposure is not well-characterized by measurements in blood or other biological matrices.

#### 3.2.4.2 Hazard Identification

Research on hazard identification in 2008–2009 included

- Ongoing studies examined the toxicity of chemical mixtures by determining interaction between components of the mixtures on both the development of long-term neurobehavioural function and glucose control, as well as changes in tissue residue levels in both parent animals and offspring as a function of co-exposure to chemicals.
- A rodent study was completed to assess the impact of dieting and the severity of diet regimen on the mobilization of lipophilic contaminants from fat stores in adult rodents.
- A chronic swine study was completed to assess the bioavailability of lead from soil and the potential cardiotoxicity of chronic exposure to lead in soil. Parallel *in vitro* bioaccessibility studies using the same lead soil were also conducted by collaborators.
- Several projects have addressed the developmental toxicity of endocrine-disrupting substances. Studies funded through the Chemicals Management Plan to examine the molecular targets of endocrine-disrupting substances have progressed to the development of rapid *in vitro* methods for identifying substances with thyroid hormone disrupting potential.
- *In vivo* and *in vitro* studies are being conducted to investigate mode and mechanism of actions of priority substances (e.g. mixtures of endocrine disrupters) under the Chemicals Management Plan. *In vivo* studies are being conducted in rodents to identify the critical period of development (*in utero* and/or the postnatal periods) sensitive to endocrine disruption caused by two different mixtures administered alone or in combination.

#### 3.2.4.3 Mechanistic Studies

To identify new biomarkers of exposure and health effects, and explain the molecular mechanisms of toxicity, scientists use genomics and proteomics methodologies to support regulatory activities. This research work has led to discoveries of relevant biomarkers of exposure, susceptibility and health outcomes of exposure to a toxicant or toxicants, including endocrine disruptors. For example, studies were conducted in 2008–2009 to

- develop a greater mechanistic understanding of processes within cells that produce genetic instability in certain repetitive DNA sequences across generations of germline and somatic cells in response to chemical exposure, in order to develop improved tools to identify and predict the hazards of environmental exposures;
- enhance the scientific understanding of adverse health effects associated with exposures to complex particulate matrices, including dust, vehicular emissions, silica particles, carbon black, cigarette smoke, cannabis smoke and engineered nanoparticles, by assessing mutagenic effects and gene expression changes in response to controlled laboratory and/or *in situ* exposures;
- develop proteomic and metabolomic methods allowing the identification of biomarkers of air pollutant toxicity, for example, from ozone or various airborne particulate materials.

#### 3.2.4.4 Population Studies

Human population studies in 2008–2009 included

- Epidemiological studies were conducted to evaluate the relationship between population exposure to air pollution and mortality, hospital admissions, emergency room visits, cancer incidence and infant health. Epidemiology panel studies were undertaken, using indoor, outdoor and personal air-pollutant exposure monitoring techniques, to assess children's exposure to source-specific pollutants, and the relation to their cardiovascular and respiratory outcomes.

- Ongoing refinement and use of the Air Quality Benefit Assessment Tool continued to estimate health benefits of proposed air pollution reductions. Methodologies for the analysis of life expectancy and quality-of-life impacts of ozone and particulate matter were being developed and will be applied to the tool. A study was undertaken to develop risk estimates specific to the most highly susceptible segments of the population. New health endpoints, such as pregnancy outcomes, were also studied.
- The Maternal–Infant Research on Environmental Chemicals is a national, multi-partner, five-year study recruiting 2000 pregnant women during the first trimester of pregnancy. The pregnant women are followed through pregnancy and up to eight weeks after birth. This study is measuring the extent to which pregnant women and their babies are exposed to environmental chemicals; assessing what pregnancy health risks, if any, are associated with exposure to heavy metals (lead, mercury, cadmium, arsenic and manganese); and measuring the levels of environmental chemicals and some of the beneficial components (nutritional and immune constituents) of breast milk.
- A Canadian study is evaluating the importance of sources of lead exposure, such as drinking water in contact with lead service lines, dust and paint, by comparing Canadian children aged 1–5 living in areas served by lead service lines, with children of the same age living in similar homes served by non-lead pipes.
- A biomonitoring study focusing on environmental lead exposure in children from pre-1970s housing in St. John's, Newfoundland and Labrador, is under way. This study is measuring lead exposure (blood lead levels) in young children living in a range of housing ages in St. John's. Concurrent measurement of residential lead levels in the sample households will permit an evaluation of exposure sources.
- A study on plastics and personal care products used during pregnancy is recruiting 80 pregnant women from the Ottawa area and collecting multiple maternal urine samples, detailed consumer product/food packaging diaries, infant urine and meconium (earliest stools), and breast milk. Meconium is being evaluated as a potential matrix for measuring *in utero* exposure. Biospecimens are being analyzed for phthalates and their metabolites, bisphenol A, triclosan and triclocarban.

#### 3.2.4.5 Air Quality Health Impacts

Air quality human health studies in 2008–2009 included

- Collection of baseline data for a range of air pollutants typically found in residences was completed for the Regina indoor and outdoor air quality study. Participant reports were completed and distributed, and data analysis continues. A similar collaborative study was initiated in Halifax to collect baseline data for a range of air pollutants, including particulate matter, ozone, nitrogen dioxide, volatile organic compounds, formaldehyde, carbon monoxide, dust and fungal contaminants.
- Spatial monitoring of air pollutants was initiated in Ottawa, Hamilton and Windsor, and completed in Winnipeg, to provide baseline information required to develop methodologies to investigate specific industrial sector sources.
- Monitoring results previously obtained in the Windsor study under the Border Air Quality Strategy are being used to develop methods of spatial analysis to estimate the Canadian population's exposure to source-specific air pollutants more precisely.
- Analysis of results continued for the Windsor exposure assessment study and the Toronto case control study for asthmatic children. The east Montréal panel study to examine the personal exposure of asthmatic school children was initiated, with fieldwork to be completed in 2009–2010. The Montréal congestive heart failure study that monitors patients commenced in 2008 and will continue to March 2011.

## 3.3 Objectives, Guidelines and Codes of Practice

Under CEPA 1999, both the Minister of the Environment and the Minister of Health shall issue environmental quality objectives, environmental

quality guidelines, release guidelines, and codes of practice.

### 3.3.1 Environmental Quality Guidelines

Environmental quality guidelines specify recommendations in quantitative or qualitative terms to support and maintain particular uses of the environment, such as protection of aquatic life, and land uses, including agricultural, industrial, commercial and residential/park land.

Table 1 lists the environmental quality guidelines that were published or were being developed through the Canadian Council of Ministers of the Environment in 2008–2009. The protocol to develop water quality guidelines was extensively revised and updated. In September 2008, the Canadian Council of Ministers of the Environment revised its publication policy and made electronic versions of all Canadian Environmental Quality Guidelines available without cost from their website.

**Table 1. Canadian environmental quality guidelines from April 2008 to March 2009**

| Guideline | Published | In Progress |
|---|---|---|
| Water | • 1,4-Dioxane (industrial solvent)<br>• Chlorpyrifos (organophosphorus insecticide)<br>• Organic waste and feed deposits on bottom sediments from aquaculture operations | • Alcohol ethoxylates* (covering 32 substances)<br>• Cadmium<br>• Carbaryl*<br>• Chlorinated paraffins<br>• Cobalt<br>• Cyanide/cyanates<br>• Endosulfan*<br>• Glyphosate*<br>• Nitrate<br>• Pentachlorophenol<br>• Uranium<br>• Zinc |
| Soil | • PAHs (16 substances) | • N-Hexane<br>• Nickel<br>• Zinc |

* In partnership with industry

*http://ceqg-rcqe.ccme.ca*

On April 19, 2008, the Minister of Health published a draft human health science assessment for inhaled manganese and a proposed health-based reference concentration for manganese in air. This reference concentration represents the concentration to which the general population, including sensitive subgroups, can be exposed for a lifetime without appreciable harm.

### 3.3.2 Drinking Water Quality Guidelines

Drinking water quality guidelines are established by the Federal–Provincial–Territorial Committee on Drinking Water; they are published by the Minister of Health under section 55 of the Act. They establish maximum acceptable concentrations of contaminants in drinking water. When a formal guideline is deemed not necessary by the committee, guidance documents may be published instead to provide advice and guidance on issues related to drinking water quality.

Table 2 lists the technical and guidance documents that were published or in progress in 2008–2009.

**Table 2. Guidelines and guidance documents for Canadian drinking water quality from April 2008 to March 2009**

| Published | In Progress |
|---|---|
| *Guideline Technical Documents* | |
| • Chlorite<br>• Chlorate<br>• Haloacetic acids | • 1,2-dichloroethane<br>• 2-methyl-4-chlorophenoxyacetic acid (MCPA)<br>• Ammonia<br>• Benzene<br>• Carbon tetrachloride<br>• Chlorine<br>• Chromium<br>• Dichloromethane<br>• Enteric viruses<br>• Fluoride<br>• Nitrate/nitrite<br>• N-nitrosodimethylamine (NDMA)<br>• Protozoa<br>• Radiological characteristics<br>• Selenium<br>• Tetrachloroethylene<br>• Vinyl chloride |
| *Guidance Documents* | |
| • Potassium from water softeners<br>• Chloral hydrate in drinking water<br>• Issuing and rescinding boil water advisories<br>• Issuing and rescinding drinking water avoidance advisories in emergency situations | • Controlling corrosion in drinking water distribution systems<br>• Heterotrophic plate counts |

*www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php#guidance*

## 3.4 State of the Environment Reporting

State of the environment reports and environmental indicators provide Canadians with information and knowledge about current environmental issues, and establish reliable scientific trend data that support informed policy and decision-making.

Canadian Environmental Sustainability Indicators for air quality, water quality and greenhouse gas emissions were released on a new website in March 2009. The air quality indicators track ground-level ozone and fine particulate matter, two key components of smog that are among the most widespread air pollutants. CESI supports hundreds of monitoring stations to produce the indicators, in particular supporting more than 450 water quality sites. The water quality indicator measures the extent and severity of water pollution by tracking a wide range of substances in water across Canada. The greenhouse gas indicator tracks Canada's greenhouse gas emissions. Findings provide important context for the Government's actions on clean air, clean water and climate change.

Key national results from 2008 include

- Air quality — Nationally, ground-level ozone exposure increased approximately 11% from 1990 to 2006, but the increasing trend in annual ozone exposures has slowed in recent years. No trend was detected in fine particulate matter exposure from 2000 to 2006.
- Water quality — From 2004 to 2006, water quality in southern Canada for the protection of aquatic life was rated as excellent at 24 sites (6%), good at 159 sites (42%), fair at 113 sites (30%), marginal at 68 sites (18%) and poor at 15 sites (4%).
- Greenhouse gases — Emissions in 2006 were 22% higher than in 1990. Emissions peaked in 2004 at 743 megatonnes and then declined by 3% from 2004 to 2006.

The Canadian Environmental Sustainability Indicators website was redesigned in 2008–2009 to make it more relevant and accessible to Canadians by

- presenting the information in a more concise and less technical manner by answering key questions about each issue;
- linking indicator results to their key social and economic drivers, as well as to how they are influenced by individual or household behaviour;
- including the ability to view and search for local or regional information on a map and, for the first time, to compare Canada's performance with that of other G-8 countries; and
- providing easier navigation to find key information related to the three main indicators of air quality, water quality and greenhouse gases.

***www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En***

## 3.5 Gathering and Reporting of Pollution and Greenhouse Gas Information

### 3.5.1 National Pollutant Release Inventory

The National Pollutant Release Inventory (NPRI) is Canada's legislated, publicly accessible inventory of pollutant releases (to air, water and land), disposals and transfers for recycling. The NPRI includes information reported by industrial facilities, and comprehensive emission summaries and trends for key air pollutants in Canada. The inventory is an important source of information for identifying, assessing and managing risks to the environment and human health. Public access to the NPRI motivates industry to prevent and reduce pollutant releases, and improves public understanding about pollution and environmental performance in Canada.

The following publications were released in 2008–2009:

- 2006 Air Pollutant Emissions Data and Updated Trends (April 2008);
- *Final Report of the National Pollutant Release Inventory Multi-Stakeholder Work Group on Substances 2008* (August 2008);

- *Reporting Facilities' and Data Users' Views on the National Pollutant Release Inventory: Final Report* (June 2008); and
- Reviewed NPRI facility data for 2007 was published in December 2008, including NPRI 2007 Highlights, a 2007 Facility Data Summary, resources for accessing NPRI facility data in various formats, and frequently asked questions.

***www.ec.gc.ca/inrp-npri***

### 3.5.2 Greenhouse Gas Emissions Reporting Program

This reporting program lays the foundation for the development of a single domestic mandatory greenhouse gas reporting system to meet the greenhouse gas reporting needs for all jurisdictions and to minimize the reporting burden for both industry and government. The program's main objectives are to provide Canadians with timely information on these emissions, to enhance the level of detail in the National Greenhouse Gas Inventory, to support the development of greenhouse gas regulations for large industrial emitters, and to meet provincial and territorial requirements for information on these emissions. The data are collected under three acts: by Environment Canada under CEPA 1999, by Statistics Canada under the *Statistics Act*, and by Alberta Environment under the *Climate Change and Emissions Management Act*.

In 2008–2009, the *Overview of the Reported 2007 Greenhouse Gas Emissions* was released on December 22, 2008. Key data tables and a dynamic search tool to query the reported data were also made available.

***www.ec.gc.ca/pdb/ghg/ghg_home_e.cfm***

# 4 Pollution Prevention (Part 4)

Part 4 of the Act provides the authority for the Minister of the Environment to require the preparation and implementation of pollution prevention plans. The Act also provides the authority for the establishment of a national pollution prevention information clearinghouse to facilitate the collection, exchange and distribution of information about pollution prevention. Authority is also provided to create an awards program to recognize significant achievements in the area of pollution prevention.

## 4.1 Pollution Prevention Plans

The provisions within Part 4 of the Act allow the Minister of the Environment to require designated persons to prepare, implement and report on pollution prevention plans for toxic substances. Pollution prevention planning Notices provide the flexibility for industry to determine the best methods within their processes and activities to meet the risk management objective within the Notice.

While there were no new pollution prevention (P2) planning Notices published in 2008–2009, there were eight P2 planning Notices affecting 229 facilities across Canada, and managing 18 substances found on Schedule 1.

***www.ec.gc.ca/planp2-p2plan***

### 4.1.1 Mercury Releases from Mercury Switches in End-of-life Vehicles

This Notice applies to certain vehicle manufacturers and steel mills, and requires preparation of a P2 plan by July 2008. The risk management objective is to reduce releases of mercury to the environment through participation in a mercury switch management program. The first interim progress reports were submitted in January 2009 and the results are being analyzed.

### 4.1.2 Base Metal Smelters and Refineries, and Zinc Plants

This Notice applies to 11 facilities. Nine of these facilities are also subject to 2008 and 2015 annual limit targets for air releases of sulphur dioxide and particulate matter. In addition, one of the nine facilities is subject to a 2008 annual limit target for mercury, and another facility is subject to a 2008 annual limit target for dioxins and furans.

In 2008–2009, the Minister received annual interim reports from the facilities. Analysis of the 2006 and 2007 data submitted by facilities indicates the following:

- Sulphur dioxide — Six out of nine facilities reported discharges that were lower than their 2008 targets.
- Particulate matter — Six out of nine facilities reported discharges that were lower than their 2008 targets.
- Mercury — The facility subject to a 2008 target reported releases that were greater than the 2008 target.
- Dioxins and furans — The facility subject to a 2008 target reported releases that were greater than the 2008 target.

### 4.1.3 Textile Mills that Use Wet Processing

As of March 31, 2009, 63 facilities had indicated that they had prepared and were implementing P2 plans that take into consideration the following two objectives:

- reduce the annual use of nonylphenol and nonylphenol ethoxylates by at least 97% by 2009, relative to the annual use in 1998; and
- reduce the toxicity of effluent to a maximum acute toxicity of 13% $IC_{50}$ (50% inhibiting concentration) by 2009.

Analysis of interim progress reports indicate that use of nonylphenol and nonylphenol ethoxylates dropped by 95.4% by 2005. By 2006, all facilities reported using, in total, less than 700 kg, surpassing the objective established in the P2 planning Notice, for a total reduction of 99.7%. Toxicity tests performed in 2006 revealed that only 22% of facilities were successful at that time. However, the majority of facilities indicated that they intend to meet the toxicity objective by 2009.

### 4.1.4 Nonylphenol and its Ethoxylates Contained in Products

This Notice applies to certain persons or facilities that manufacture or import soap and cleaning products, or processing aids used in the wet textile industry or pulp and paper industry. Phase 1 sets a reduction target of 50% from base year levels (typically 1998), of the total mass of nonylphenol and nonylphenol ethoxylates used in the manufacturing of products or imported annually. Phase 2 sets a target of 95% reduction from base year levels of the total mass used in the manufacturing of products or imported annually.

As of March 31, 2009, 72 facilities had declared that they had prepared and were implementing a P2 plan. In 2006, interim progress reports were received along with five submissions declaring that their facility had fully implemented their P2 plan. Analysis of these reports indicates that the annual use of nonylphenol and nonylphenol ethoxylates in manufacturing was reduced to 0.80 million kg in 2006 (a 63% reduction from 1998 base year) and imports were reduced to 0.23 million kg in 2006 (an 81% reduction from 1998 base year).

### 4.1.5 Inorganic Chloramines and Chlorinated Wastewater Effluents

This Notice applies to owners or operators of certain wastewater systems. The risk management objective is to achieve and maintain a concentration of total residual chlorine that is less than or equal to 0.02 mg/L in the effluent released to surface water by December 15, 2009.

As of March 31, 2009, 84 facilities had declared that they had prepared and were implementing a P2 plan. Four of the 84 facilities declared that they had already fully implemented their P2 plan. The remaining facilities have until June 15, 2010, to implement their P2 plans.

### 4.1.6 Wood Preservation Facilities

This Notice applies to wood preservation facilities that use inorganic arsenic compounds, hexavalent chromium compounds, polychlorinated dibenzodioxins, polychlorinated dibenzofurans or hexachlorobenzene. The risk management objective is to reduce releases of these substances to the lowest achievable levels by applying or achieving equivalence with certain best management practices.

The five facilities that were named in the Notice were required to prepare and implement a P2 plan by March 2006. As of March 31, 2009, three of the facilities had declared that they had fully implemented P2 plans. The other two facilities closed their operations.

### 4.1.7 Dichloromethane

A total of 38 facilities from 5 different industry sectors prepared and implemented pollution prevention plans in response to this Notice. Table 3 identifies the overall objectives of the Notice as well as the targeted sectors, the deadlines for implementation and the corresponding risk management objectives.

**Table 3. Dichloromethane P2 requirements**

| Sectors | Deadline for Implementation | Risk Management Objective |
|---|---|---|
| Overall objective | 01-Jan-07 | Reduce annual release by 85% from 1995 base year level |
| Adhesives formulation | 31-Dec-05 | 70% reduction of uses |
| Aircraft paint stripping, including the stripping of aircraft components | 31-May-08 | 80% reduction of annual releases |
| Flexible polyurethane foam blowing | 31-May-08 | 100% reduction of annual releases |
| Industrial cleaning | 31-May-08 | 80% reduction of annual release and 100% elimination of uses for cleaning the mixing chamber low-pressure injection molding machines |
| Pharmaceuticals and chemical intermediates manufacturing and tablet coating | 31-Dec-05 | 80% reduction of annual releases |

Final results indicated that releases were reduced by 93% compared with 1995 levels, thereby exceeding the overall objective. More specifically, the Notice resulted in reductions in uses of dichloromethane from 900 000 kg in 1995 to 60 000 kg by the end of the P2 plan implementation period. These reductions were achieved through the replacement of dichloromethane with alternatives, the reformulation of products and other pollution prevention methods.

### 4.1.8 Acrylonitrile

This Notice requires facilities that manufacture synthetic rubber to reduce the releases of acrylonitrile to the lowest possible level.

One facility falls under the Notice and fully implemented their P2 plan in 2006. The facility reduced fugitive releases by 89%, and storage or handling releases by 82%, from a base year of 1996. The facility continued to control emissions below 2006 levels until 2008 when acrylonitrile emissions ceased as the nitrile rubber manufacturing unit in the plant was closed.

## 4.2 Pollution Prevention Awards

Environment Canada participates in the Canadian Council of Ministers of the Environment Pollution Prevention Awards Program, which recognizes organizations that have shown leadership and innovation in pollution prevention. The five award recipients in 2008 were

- MicroBusiness Category — Awarded to LOGical Creations Ltd. from Airdrie, Alberta, for their TREECYCLE program.
- Medium Business Category — Awarded to Steelcase Canada from Markham, Ontario, for reducing the use and releases of toxic substances within their processes.
- Organization/Institution/Group Category — Awarded to two recipients: the North York General Hospital in Toronto, Ontario, for their Green Team Initiative; and the University Health Network in Toronto, Ontario, for their Environmental Management System.
- Greenhouse Gas Reduction Category — Awarded to the Cogeneration Facility Operated by Hamilton Renewable Power Incorporated at the Woodward Avenue Wastewater Treatment Plant for their impressive reductions in greenhouse gas emissions.

***www.ccme.ca/ourwork/pollution.html?category_id=134***

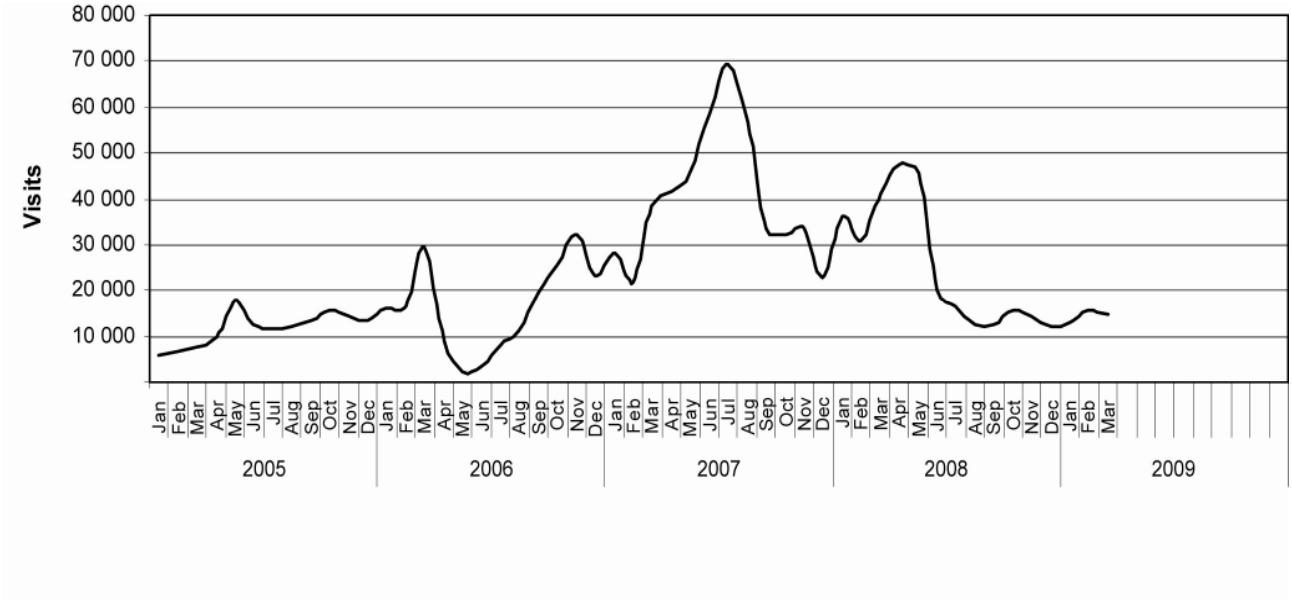
## 4.3 Canadian Pollution Prevention Information Clearinghouse

The Canadian Pollution Prevention Information Clearinghouse is a public website that was developed in 1998 to provide comprehensive information and tools for Canadians to strengthen their capacity to prevent pollution.

In 2008–2009, 180 new records were added to the clearinghouse and the number of visits levelled off to an average of 15 000 visits each month. The clearinghouse continues to be an important tool for the public, industry and youth when researching pollution prevention techniques, case studies and resources. Efforts to promote the clearinghouse continue through website links, articles and newsletters.

***www.ec.gc.ca/cppic***

**Figure 2. Number of visits to the Canadian Pollution Prevention Information Clearinghouse (March 2005 (site relaunch) to March 2009)**



# 5 Controlling Toxic Substances (Part 5)

Part 5 of the Act includes specific requirements for the assessment and management of substances currently existing in commerce (substances on the Domestic Substances List) or being released to the environment in Canada and substances that are new to Canada.

CEPA 1999 introduced a requirement for the Government to sort through, or "categorize," the substances on the Domestic Substances List (DSL). The categorization process identified substances that

- were suspected to be inherently toxic to humans or to the environment, and are persistent (take a very long time to break down) and/or bioaccumulative (collect in living organisms and end up in the food chain); or
- present the greatest potential for exposure to Canadians.

As a result of the September 2006 completion of the categorization exercise, the Ministers identified approximately 19 000 substances that needed no further action at that time and approximately 4300 chemical substances that needed further attention, such as screening assessments, research, or measures to control the use or release of the substance. These 4300 substances are being managed under the Government's Chemicals Management Plan, which was launched in December 2006. Activities under the Chemicals Management Plan include risk assessment, risk management, research and monitoring/surveillance.

## 5.1 Existing Substances

Through the Existing Substances Program, the Ministers jointly identify, prioritize, assess and manage the risks resulting from exposure to existing substances, which are listed on the DSL. Note that the DSL includes mostly chemicals but also includes about 45 living organisms (all micro-organisms); reporting on living organisms is included in Part 6 of this report.

***www.chemicalsubstanceschimiques.gc.ca***

### 5.1.1 Risk Assessment

Through the Challenge under the Chemicals Management Plan, the Government committed to address the 200 highest priority substances. These 200 substances have been divided up into a number of smaller groups or "batches" that are being addressed sequentially. Each batch of substances in the Challenge progresses through various information-gathering, screening assessment, management and regulatory stages. Every three months, a batch of 12 to 20 substances is launched by publishing the names of these substances in the *Canada Gazette*, Part 1, for a six-month call for information.

As of March 31, 2009, 9 of the 12 batches under the Chemicals Management Plan Challenge had been launched, and draft or final assessment decisions had been published for the 88 substances in Batches 1 through 5. Appendix C lists the assessment decisions for individual substances in Batches 1 through 5.

Other types of risk assessments were also conducted on various other existing substances. In 2008–2009, draft or final assessment decisions were published for a total of 251 existing substances or groups of substances, including those under the Challenge. Table 4 provides a summary of these decisions.

**Table 4. Summary of existing substance assessment decisions published from April 2008 to March 2009**

***(NFA = no further action; PSL1 = First Priority Substances List; PSL2 = Second Priority Substances List; SNAc = Significant New Activity Notice; VE = virtual elimination)***

| Substance or Number of Substances | Batch Launch Date | Type of Assessment | Meets s.64 Criteria | Proposed Measure | Draft Notice | Final Notice |
|---|---|---|---|---|---|---|
| 15 Chlorinated paraffins | n/a | PSL1 follow-up | Yes | Add to Schedule 1 for all and VE for some | | 30-Aug-08 |
| 145 Substances on the DSL but no longer in commerce | n/a | Rapid screening | No | SNAc and NFA | | 7-Jun-08 |
| Aluminum chloride, aluminum nitrate and aluminum sulphate | n/a | PSL2 | No | NFA | 7-Feb-09 | |
| Decabromodiphenyl ether | n/a | Ecological State of the Science | Yes (already on Schedule 1) | Consider when developing new measures for PBDEs | 28-Mar-09 | |
| 15 Substances | 3-Feb-07 | Screening – Batch 1 | Yes for 9 substances; no for 6 substances | Add to Schedule 1 for 9 substances, including VE for 1 substance; NFA for 6 substances | | 5-Jul-08 |
| 17 Substances | 12-May-07 | Screening – Batch 2 | Yes for 9 substances; no for 8 substances | Add to Schedule 1 for 9 substances, including VE for 1 substance; NFA for 8 substances | 17-May-08, 23-May-08 and 19-Apr-08 | 18-Oct-08 and 31-Jan-09 |
| 19 Substances | 18-Aug-07 | Screening – Batch 3 | Yes for 4 substances; no for 15 substances | Add to Schedule 1 for 4 substances; NFA for 15 substances, including SNAcs for 4 substances | 23-Aug-08 | 7-Mar-09 |
| 18 Substances | 17-Nov-07 | Screening – Batch 4 | Yes for 3 substances, including 1 for VE; no for 13 substances; screening assessments needed for 2 substances | | 24-Jan-09 | |
| 19 Substances | 16-Feb-08 | Screening – Batch 5 | Yes for 2 substances; no for 17 substances | Add to Schedule 1 for 2 substances; NFA for 17 substances, including SNAcs for 2 substances | 21-Feb-09 | |
| 18 Substances | 31-May-08 | Screening – Batch 6 | | | | |
| 14 Substances | 31-Aug-08 | Screening – Batch 7 | | | | |
| 14 Substances | 31-Jan-09 | Screening – Batch 8 | | | | |
| 17 Substances | 14-Mar-09 | Screening – Batch 9 | | | | |

Another key element of the Chemicals Management Plan is the Petroleum Sector Stream Approach, which includes approximately 160 petroleum substances that are considered high priority. These substances were set aside from the Challenge process. In 2008–2009, data were collected on toxicology, environmental fate, exposure, manufacture, import and use. Screening assessments of the petroleum substances have commenced and information has been collected on existing regulatory and non-regulatory tools for these substances to inform any additional measures that may be needed.

## 5.1.2 Risk Management

### 5.1.2.1 Addition of Substances to Schedule 1

Table 5 lists the substances or groups of substances that were proposed to be added to Schedule 1 of CEPA 1999 (the List of Toxic Substances) in 2008–2009. No substances were added to Schedule 1 from April 2008 to March 2009.

**Table 5. Proposed orders adding substances to Schedule 1 of CEPA 1999 from April 2008 to March 2009**

| Substance | Draft Order |
|---|---|
| 1,2-Benzenediol | 20-Sep-08 |
| 1,4-Benzenediol | 20-Sep-08 |
| 15 Chlorinated paraffins | 30-Aug-08 |
| Ethyloxirane | 20-Sep-08 |
| Methyloxirane | 20-Sep-08 |
| Naphthalene | 20-Sep-08 |
| Propanedinitrile, [[4-[[2-(4-cyclohexylphenoxy)ethyl] ethylamino]-2-methylphenyl]methylene]- | 20-Sep-08 |
| Toluene diisocyanates (three substances) | 20-Sep-08 |

### 5.1.2.2 Significant New Activity Notices

In 2008–2009, Notices of Intent to apply Significant New Activity Notices were published for 13 substances and final Orders were published for 148 substances (Table 6). A person who intends to use, manufacture or import any of these substances for a significant new activity in quantities exceeding 100 kg/year must provide prescribed information to assess the substance prior to its use, manufacture or import.

### 5.1.2.3 Changes to the Domestic Substances List

By Ministerial Order published on June 25, 2008, 534 substances were deleted from the DSL, as they did not meet the statutory criteria for inclusion in the List. On the same date, 531 of the 534 substances were added to the Non-domestic Substances List, as they were in commercial use in other countries. This means that these substances will be subject to the New Substances Notification Program if any person intends to manufacture or import any of these substances. The Minister also indicated the Government's intent to delete another 483 substances from the DSL.

**Table 6. Significant New Activity Notices for existing substances from April 2008 to March 2009**

| Substance | Draft Notice | Final Order |
|---|---|---|
| 145 Persistent, bioaccumulative and inherently toxic substances but no longer in Canadian commerce | | 25-Jun-08 |
| 1-Propanaminium, 3-[[4-[(2,4-dimethylphenyl)amino]-9,10-dihydro-9,10-dioxo-1-anthracenyl]amino]-N,N,N-trimethyl-, methyl sulfate | 23-Aug-08 | 18-Mar-09 |
| 2-Butanone, 4-[[[1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-(1-methylethyl)-1-phenanthrenyl]methyl](3-oxo-3-phenylpropyl)amino]-, [1R-(1α,4aβ,10aα)]- | 24-Jan-09 | |
| 9,10-Anthracenedione, 1,4-bis[(4-methylphenyl)amino]-, sulfonated, potassium salts | 24-May-08 | |
| 9,10-Anthracenedione, 1-[(5,7-dichloro-1,9-dihydro-2-methyl-9-oxopyrazolo[5,1-b]quinazolin-3-yl)azo]- | 23-Aug-08 | 18-Mar-09 |
| 9,10-Anthracenedione, 1-amino-4-(phenylamino)- | 23-Aug-08 | 18-Mar-09 |
| Adenosine, N-benzoyl-5'-O-[bis(4-methoxyphenyl)phenylmethyl]-2'-deoxy- | 24-Jan-09 | |
| Amines, C18-22-tert-alkyl, ethoxylated | 24-Jan-09 | |
| Benzamide, 3,5-dichloro-N-(3,4-dichlorophenyl)-2-hydroxy- | 24-Jan-09 | |
| Benzenesulfonic acid, [(9,10-dihydro-9,10-dioxo-1,4-anthracenediyl) bis(imino-4,1-phenyleneoxy)]bis-, disodium salt | 24-May-08 | |
| Benzenesulfonic acid, 2,2'-[(9,10-dihydro-5,8-dihydroxy-9,10-dioxo-1,4-anthracenediyl)diimino]bis[5-(1,1-dimethylethyl)-, disodium salt | 24-May-08 | |
| Benzoic acid, 2-[(3,5-dibromo-4-hydroxyphenyl)(3,5-dibromo-4-oxo-2,5-cyclohexadien-1-ylidene)methyl]-, ethyl ester | 24-Jan-09 | |
| Ethanol, 2-[[4-[(2,6-dichloro-4-nitrophenyl)azo]phenyl]methylamino]- | 21-Feb-09 | |
| Ethanol, 2-ethoxy-, acetate | 7-Mar-09 | |

#### 5.1.2.4 Regulations

Table 7 lists the proposed and final regulations published under Part 5 of CEPA 1999 in 2008–2009. These include final regulations regarding perfluorooctane sulfonate and its salts, and polybrominated diphenyl ethers, which were targeted for immediate action under Canada's Chemicals Management Plan.

## 5.2 New Substances

Substances that are not on the DSL are considered to be new to Canada. New substances may not be manufactured in or imported into Canada unless the Minister has been notified with certain prescribed information, and the potential risk to the environment and human health has been assessed, or the period for assessing the information has expired. Note that new substances include living organisms; reporting on living organisms is included in Part 6 of this report.

In 2008–2009, 492 new substance notifications were received pursuant to the *New Substances Notification Regulations (Chemicals and Polymers)*. Of the 492 notifications received, the Minister issued 28 Significant New Activity Notices (Table 8), 10 Ministerial Conditions (Table 9) and no prohibitions.

Of the 492 notifications, 53 related to chemicals or polymers intended solely for use in *Food and Drugs Act* products. In 2008–2009, one Significant New Activity Notice and three requests for additional information were published in relation to these substances.

In 2008–2009, Health Canada co-sponsored a workshop on pharmaceuticals and personal care products in the Canadian environment. The workshop assessed the current state of Canada's analytical science research on these products in government, academia and industry laboratories. The principal focus of the workshop was to help standardize analytical methods in Canada, set a priority list of pharmaceuticals and personal care products for monitoring, and develop a Web portal that government, academia and industry can use to collaborate, communicate, increase process efficiencies and exchange knowledge.

**Table 7. Regulations from April 2008 to March 2009**

| Regulation | Draft Notice | Final Order |
|---|---|---|
| *PCB Regulations* | | 17-Sep-08 |
| *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations* | | 11-Jun-08 |
| *Polybrominated Diphenyl Ethers Regulations* | | 9-Jul-08 |
| *Regulations Adding Perfluorooctane Sulfonate and Its Salts to the Virtual Elimination List* | 6-Sep-08 | 4-Feb-09 |
| *Regulations Amending the Federal Halocarbon Regulations, 2003* | 5-Jul-08 | |
| *Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations* | 26-Apr-08 | |
| *Volatile Organic Compound (VOC) Concentration Limits for Automotive Refinishing Products Regulations* | 26-Apr-08 | |
| *Volatile Organic Compound (VOC) Concentration Limits for Certain Products Regulations* | 26-Apr-08 | |

**Table 8. Significant New Activity Notices for new substances from April 2008 to March 2009**

| Substance | Final Notice |
|---|---|
| 1,2-Propanediol, 3-amino-, dialkyl derivatives | 10-May-08 |
| 1-Hexadecanol, manuf. of, distn. lights | 24-Jan-09 |
| 2,4,7,9-Tetramethyl-4,7-decanediol | 10-Jan-09 |
| 2-Propenoic acid, 2-hydroxyethyl ester, telomere with 2mercaptoethanol, polyalkyleneglycol acrylate, polyalkyleneglycol polyacrylate and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-propenoate | 29-Nov-08 |
| 2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl ester, polymer with polyalkyleneglycol acrylate | 29-Nov-08 |
| Aliphatic alkyl diester of succinic acid | 28-Feb-09 |
| Alkanes, C14-16 | 22-Nov-08 |
| Alkanoic acid, dihydroxy-,2-alkyl esters | 19-Jul-08 |
| Benzoic acid, 2-hydroxy-, 2-butyloctyl ester | 14-Feb-09 |
| Carbamic acid, [(butylthio) thioxomethyl]-, butyl ester | 24-Jan-09 |
| Cobalt lithium manganese nickel oxide | 24-Jan-09 |
| Fatty acids, tall-oil, reaction products with alkylamine and 2-propenoic acid | 1-Nov-08 |
| Ferrate(1-), bis[3,5-bis(1,1-dimethylethyl)-2-(hydroxy- kO)benzoato(2-)- kO]-, hydrogen | 27-Dec-08 |
| Lithium cobalt manganese nickel oxide | 21-Feb-09 |
| Methanone, [1,1'-biphenyl]-4-ylphenyl- | 18-Oct-08 |
| Oxirane, 2,2'-[(1-methylethylidene)bis[4,1-phenyleneoxy[1-(butoxymethyl)-2,1-ethanediyl]oxymethylene]]bis- | 6-Dec-08 |
| Oxirane, 2-methyl-, polymer with oxirane, ether with 1,2,3-propanetriol (3:1), tris[N-[methyl-3-[[(nonylphenoxy)carbonyl]amino]phenyl]carbamate] | 10-May-08 |
| Phosphoric acid, iron(2+) lithium salt (1:1:1) | 10-Jan-09 |
| Polyfluoro acrylate, polymer with chloroethene | 29-Nov-08 |
| Polyfluoro acrylate, polymer with chloroethene | 29-Nov-08 |
| Propanenitrile, 3-[[4-[2-(4-nitrophenyl)diazenyl]phenyl] (substitutedmethyl)amino]- | 19-Apr-08 |
| Silane homopolymer, hydrolysis products with magnesium hydroxide | 24-Jan-09 |
| Silane, trimethoxy[3-(oxiranylmethoxy)propyl]-, hydrolysis products with silica | 6-Sep-08 |
| Substituted 2-Propenoic acid, 2-methyl-, alkyl ester, polymer with alkylaminoalkyl 2-methyl-2-propenoate, 2-hydroxyethyl 2-methyl2-propenoate, and perfluoroalkylethyl 2-methyl-2-propenoate, acetate (salt) | 16-Aug-08 |
| Substituted silylated resorcinol, reaction products with trimethoxysilanesilica hydrolysis products | 9-Aug-08 |
| Supramolecular complex of di(bisalkylsulfosuccinate) barium salt with barium hydrogen phosphate (2:1) | 11-Oct-08 |
| Thioimidodicarbonic acid ((HO)C(O)NHC(S)(OH)), C,C'-dibutyl ester | 12-Jul-08 |
| Tin titanium zinc oxide | 24-Jan-09 |

**Table 9. Notices of Ministerial Conditions for new substances from April 2008 to March 2009**

| Substance | Final Notice |
|---|---|
| Amide of 3-(trimethylaminium)-1-propylamine, chloride salt | 4-Oct-08 |
| Amines, alkyl, compounds with 2-mercapto-dialkyl-1,3,2-dioxaphosphorinane 2-oxide (1:1) | 17-May-08 |
| Benzene, 1,1'-(1,2-ethanediyl)bis(2,3,4,5,6-pentabromo)- | 4-Oct-08 |
| Benzene, 1,1'-(1,2-ethanediyl)bis(2,3,4,5,6-pentabromo)- | 4-Oct-08 |
| Benzene, 1,1'-(1,2-ethanediyl)bis(2,3,4,5,6-pentabromo)- | 3-Jan-09 |
| Benzene, 1,1'-(1,2-ethanediyl)bis(2,3,4,5,6-pentabromo)- | 3-Jan-09 |
| Benzene, 1,1'-(1,2-ethanediyl)bis(2,3,4,5,6-pentabromo)- | 19-Apr-08 |
| Butanamide, 3-oxo- | 20-Sep-08 |
| Hydroxyfatty acid, (9Z, 12R)-homopolymer, 3-(dimethyl amino) propylamide, di-Me sulphate-quaternized | 17-May-08 |
| Poly(oxy-1,2-ethanediyl), α-[3-[1,3,3,3-tetramethyl-1-[(trimethylsilyl) oxy]disiloxanyl]propyl]-ω-hydroxy- | 8-Nov-08 |

## 5.3 Export of Substances

The Act allows the Minister to establish an Export Control List containing substances whose export is controlled because their manufacture, import and/or use in Canada are prohibited or severely restricted or because Canada has agreed, through an international agreement, such as the Rotterdam Convention, to control their export. The Minister can also make regulations regarding substances specified on the Export Control List.

A total of 57 notices of export were received from April 2008 to March 2009.

# 6 Animate Products of Biotechnology (Part 6)

The Act establishes an assessment process for living organisms that are new animate products of biotechnology, which mirrors provisions in Part 5 of CEPA 1999 respecting new substances that are chemicals or polymers. Part 5 also includes a provision under 74(*b*) that requires that all living organisms on the DSL (about 45 micro-organisms) undergo a screening assessment.

## 6.1 Existing Substances

In 2008–2009, through the New Substances Program, the Ministers jointly managed the screening assessment process for micro-organisms listed on the DSL. Guidelines were finalized and will be published on the website when approved. The guidelines include a risk assessment framework guideline, a prioritization guideline for DSL living organisms and a guideline for the external review of the draft screening assessment reports.

The Technical Expert Group continued to provide advice on the process and to validate the scientific basis of screening assessments and their conclusions. The Technical Expert Group is composed of independent scientific experts from academia, industry, public advocacy groups and other federal government departments. In 2008–2009, an annual report highlighting the Technical Expert Group's recommendations and the Government's response was also produced.

Work continued on planning and refining the approach for an information gathering notice under CEPA 1999 (section 71) to obtain basic information on the manufacture, import and use of DSL micro-organisms. The Technical Expert Group provided valuable comments on the information to be captured through this activity.

## 6.2 New Substances

During 2008–2009, three notifications were received pursuant to the *New Substances Notification Regulations (Organisms)* for new animate products of biotechnology. Significant New Activity Notices were published for two of these substances.

# 7 Controlling Pollution and Managing Waste (Part 7)

Part 7 of CEPA 1999 provides the Minister with authorities to deal with various substances that have the potential to harm the environment or human health.

## 7.1 Disposal at Sea

The disposal of waste at sea within Canadian jurisdiction and by Canadian ships in international waters requires a permit issued by the Minister. A permit for disposal at sea will be approved only if it is the environmentally preferable option. Incineration at sea is banned except under emergency situations. CEPA 1999 provides additional controls on disposal at sea, including

- a prohibition on the export of a substance for disposal in an area of the sea under the jurisdiction of a foreign state or in its internal waters;
- a list of six substances that can be disposed of at sea (Schedule 5 to the Act);
- an assessment framework for reviewing permit applications based on the precautionary principle, which must be followed (Schedule 6 to the Act); and
- a statutory obligation for the Minister of the Environment to monitor selected sites.

*www.ec.gc.ca/seadisposal/main/index_e.htm*

### 7.1.1 Disposal at Sea Permits

In 2008–2009, 96 permits were issued in Canada for the disposal of 3.79 million tonnes of waste and other matter, compared with 98 permits for the disposal of 4.74 million tonnes in 2007–2008. Most of this was dredged material that was removed from harbours and waterways to keep them safe for navigation. The number of permits issued has remained relatively stable since 1995. Less material was permitted for disposal in 2008–2009 than in 2007–2008 owing to a decrease in need from several large clients. There was a significant drop in the quantity of geological matter permitted for disposal in 2008–2009 as a result of the completion of several capital works for the 2010 Olympics and a slowing in the economy. The quantity of dredged material disposed of decreased due to a decreased volume of spring freshets depositing sediments in estuaries. Table 10 lists the number of disposal at sea permits and quantities permitted from 2008 to 2009, and Table 11 lists this information by region.

**Table 10. Disposal at sea quantities permitted (in tonnes) and permits issued in Canada from April 2008 to March 2009**

| Material | Quantity Permitted | Permits Issued |
|---|---|---|
| Dredged material | 3 113 760* | 45 |
| Geological matter | 611 000* | 4 |
| Fisheries waste | 67 985 | 46 |
| Vessels | – | – |
| Organic | 200 | 1 |
| **Total** | **3 792 945** | **96** |

* Dredged material and geological matter were converted to tonnes using an assumed density of 1.3 tonnes per cubic metre.

### 7.1.2 Disposal Site Monitoring Program

CEPA 1999 requires the monitoring of disposal sites to verify that permit conditions were met, and that scientific assumptions made during the permit review and site selection process were correct and sufficient to protect the marine environment. In 2008–2009, monitoring projects were completed on a total of 20 ocean disposal sites involving fieldwork conducted in the summer of 2007. The fieldwork included site stability and chemical concentration analysis at nine sites in the Quebec Region, a study of a scrap metal storage site in the Prairie and Northern Region, and baseline studies at six sites in the Atlantic Region. In addition to routine monitoring, several reviews of historical monitoring data were conducted to better streamline and manage future disposal activities. Following an extensive review of historical data and the emergence of disposal alternatives, 18 sites were closed in the Pacific and Yukon Region. It is worth noting that one of these sites was closed because of the discovery of a rare cold-water sponge reef in the area. Monitoring data were instrumental in the

**Table 11. Disposal at sea quantities permitted (in tonnes) and permits issued by region from April 2008 to March 2009**

| Material | Atlantic | | Quebec | | Pacific and Yukon | | Prairie and Northern | |
|---|---|---|---|---|---|---|---|---|
| | Quantity Permitted | Permits Issued | Quantity Permitted | Permits Issued | Quantity Permitted | Permits Issued | Quantity Permitted | Permits Issued |
| Dredged material* | 1 003 860 | 12 | 592 800 | 13 | 1 517 100 | 20 | – | – |
| Geological matter* | – | – | – | – | 611 000 | 4 | – | – |
| Fish waste | 66 085 | 42 | 1900 | 4 | – | – | – | – |
| Vessels | – | – | – | – | – | – | – | – |
| Organic | – | – | – | – | – | – | 200 | 1 |
| **Total** | **1 069 945** | **54** | **594 700** | **17** | **2 128 100** | **24** | **200** | **1** |

* Dredged material and geological matter were converted to tonnes using an assumed density of 1.3 tonnes per cubic metre.

development of harbour management plans for Charlottetown, Prince Edward Island, and the Saint John harbour, New Brunswick.

***www.ec.gc.ca/seadisposal/reports/index_e.htm#compend***

## 7.2 Control of Movement of Hazardous Waste and Hazardous Recyclable Material and of Prescribed Non-hazardous Waste for Final Disposal

CEPA 1999 enables the making of regulations governing the export and import of hazardous waste, including hazardous recyclable materials. The Act also enables authorities to make regulations on the export and import of prescribed non-hazardous waste for final disposal. The Act requires exporters of hazardous wastes destined for final disposal to submit export reduction plans; and sets out criteria that the Minister may consider in refusing to issue an export, import, or transit permit if the waste or recyclable material will not be managed in a manner that will protect the environment and human health.

Canada implements its international obligation as a Party to the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* through the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* made under this Division of the Act.

In June 2008, at the 9th meeting of the Conference of the Parties to the Basel Convention, Canada led a decision on a strategic review of the Basel Convention with the aim of reviewing Parties' capacity to implement the Basel Convention objectives, such as ensuring the environmentally sound management of waste.

During the calendar year[1] January 2008 to December 2008, the quantity of hazardous waste and hazardous recyclable material imported into Canada was 509 501 tonnes (t). This represented an increase of approximately 8% over the total 2007 import quantity, which was 470 136 t. The increase in the total quantities imported into Canada during 2008 amounted to 39 365 t, of which about 70% were hazardous recyclable materials and about 30% were hazardous waste destined for disposal operations. During 2008, just over 52 200 individual transboundary shipments of hazardous waste and hazardous recyclable material were reported in movement documents received.

In the case of exports of hazardous waste and hazardous recyclable material out of Canada, the overall quantities also increased marginally in 2008 compared with 2007 figures. In 2007, the total quantities of hazardous waste and hazardous recyclable material exports combined amounted to 452 396 t, which increased to 457 806 t in 2008. In this instance, there was a slight increase in the quantity of hazardous recyclable materials

[1] Export and import quantities set out in Section 7.2 represent actual movement values that took place during the 2008 calendar year (from January 1 to December 31, 2008). These values are consistent with Canada's international reports, which are all based on the calendar year.

that were exported, from approximately 352 933 t in 2007 to 354 722 t in 2008. This represents an increase of 1789 t or approximately a third of the overall total increase of 5410 t.

During 2008, nearly 4000 notices were processed for proposed imports, exports and transits of hazardous wastes and hazardous recyclable materials. The notices received covered over 14 800 individual waste streams, which exhibited a range of hazardous properties from explosivity, flammability, acute toxicity, corrosivity, dangerous reactivity and environmental hazard.

The annual statistics for international transboundary movements indicate that in 2008, nearly 99.9% of Canadian imports came from the United States, with the remainder coming from Europe and Mexico as hazardous recyclable materials destined for metal recovery operations. Shipments destined for recycling, which reduce reliance on primary resources and benefit Canadian industry, represented nearly 49% of all imports in 2008, an increase from 47% in 2007. Used or spent batteries, metal-bearing waste, used or spent liquors from metallurgical processes, used lubricating oils and manufacturing residues made up the majority of imports of hazardous recyclable material into Canada. Hazardous waste imports destined for disposal operations included solid wastes no longer suitable for metal recovery, industrial residues and environmentally hazardous substances.

Imports of hazardous recyclable materials destined for recycling operations in 2008 were shipped to five provinces. Quebec and Ontario continued to receive the vast majority of all imports into Canada, with smaller quantities imported into British Columbia, Alberta and New Brunswick. The situation was similar for imports of hazardous waste for final disposal, with most destined for Quebec and Ontario, and relatively small quantities imported into Alberta, Manitoba and Saskatchewan.

In 2008, exports of hazardous recyclable materials originated from eight provinces, with Ontario and Quebec accounting for 73% of all shipments out of Canada. The bulk of these shipments were sent to authorized environmentally sound facilities located in the northeastern and central United States. The only two provinces that did not export any hazardous waste or hazardous recyclable materials in 2008 were Newfoundland and Labrador, and Prince Edward Island. No exports were made from any of the territories.

Figure 3 shows the trends of imports and exports, and Tables 12 and 13 list the quantities imported and exported from 2001 to 2008.

**Figure 3. Imports and exports of hazardous waste and hazardous recyclable material, 2001–2008 (tonnes)**

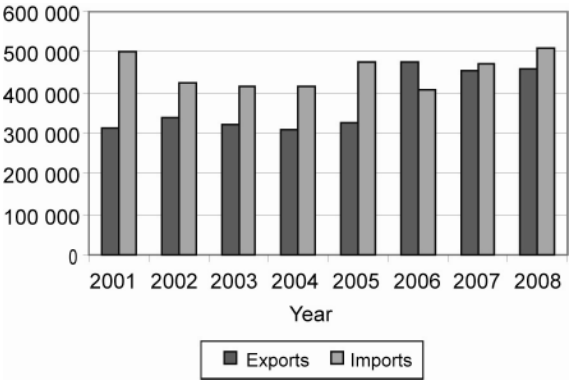



**Table 12. Hazardous waste and hazardous recyclable material, imports, 2001–2008 (tonnes)**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|
| Recyclables | 237 069 | 193 318 | 189 110 | 200 097 | 174 983 | 164 903 | 220 377 | 247 763 |
| Total imports | 499 758 | 423 067 | 417 368 | 416 136 | 476 416 | 408 839 | 470 136 | 509 501 |

**Table 13. Hazardous waste and hazardous recyclable material, exports, 2001–2008 (tonnes)**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|
| Recyclables | 237 872 | 238 597 | 205 356 | 187 986 | 226 380 | 374 024 | 352 933 | 354 722 |
| Total exports | 313 361 | 340 261 | 321 294 | 308 357 | 327 746 | 474 538 | 452 396 | 457 806 |

# 8 Environmental Emergencies (Part 8)

Part 8 of CEPA 1999 allows for the prevention of, preparedness for, and response to the uncontrolled, unplanned or accidental release of a substance that poses potential harm to the environment or to human health and for the recovery of the released substance. Part 8 provides the authority for environmental emergency plans, regulations, guidelines and codes of practice. CEPA 1999 also establishes a regime that makes the person who owns or controls the substance liable for restoring the damaged environment and for the costs and expenses incurred in responding to an environmental emergency.

Under the *Environmental Emergency Regulations*, persons who own or manage any of the 174 flammable and other hazardous substances specified in Schedule 1 of the Regulations at or above certain thresholds must provide required information on the substance quantities and container sizes. Persons meeting both the quantity and container criteria must prepare and implement environmental emergency plans. If only one criterion is met, regulatees are required to submit only a Notice of Identification of Substance and Place.

The environmental emergency plans website includes model plans, a common issues section, and online notice filing and search capabilities. The database provides public access to basic information about registered facilities (e.g. company names and addresses).

As of March 31, 2009, a total of 5400 facilities had filed Notices of Identification of Substance and Place. This number represents a 35% increase from the last report for 2005–2006. The five most commonly reported substances were propane, anhydrous ammonia, chlorine, n-pentane and gasoline. Ninety-one of the 174 substances on the list have been reported at least once. In addition, 2332 facilities have filed notices indicating that they have prepared and implemented environmental emergency plans.

# 9 Government Operations and Federal and Aboriginal Lands (Part 9)

Part 9 of the Act provides the authority to make regulations, guidelines and codes of practice that apply to departments, boards and agencies of the Government of Canada; federal works and undertakings; federal land; Aboriginal land; persons on that land and other persons insofar as their activities involve that land; and Crown corporations.

In 2008–2009, Environment Canada worked with partners and stakeholders to improve wastewater management across Canada, and minimize the risks to human and ecosystem health and fishery resources from wastewater effluents. On February 17, 2009, the Canada-wide Strategy for the Management of Municipal Wastewater Effluent was endorsed by the Canadian Council of Ministers of the Environment. The strategy sets out a harmonized framework to manage discharges from more than 3500 wastewater facilities in Canada, many of which are currently in need of repair and upgrading. It provides an agreed-upon path forward for achieving regulatory clarity for owners of municipal wastewater facilities, and performance standards to increase protection for human health and the environment on a national basis.

# 10 Compliance and Enforcement (Part 10)

CEPA 1999 provides enforcement officers with a wide range of powers to enforce the Act, including the powers of a peace officer. Enforcement officers can carry out inspections to verify compliance with the Act; conduct investigations of suspected violations; enter premises, open containers, examine contents and take samples; conduct tests and measurements; obtain access to information (including data stored on computers); stop and detain conveyances; search, seize and detain items related to the enforcement of the Act; secure inspection warrants to enter and inspect premises that are locked and/or abandoned or where entry has been refused; seek search warrants; and arrest offenders. CEPA analysts can enter premises when accompanied by an enforcement officer and can exercise certain inspection powers.

Enforcement officers can select from a wide range of responses to alleged violations, including directions, tickets, prohibition orders, recall orders, detention orders for ships, Environmental Protection Compliance Orders (EPCOs), injunctions to stop or prevent a violation, prosecutions and Environmental Protection Alternative Measures (EPAMs). Enforcement activities include measures to compel compliance without resorting to formal court action and measures to compel compliance through court action. The former are directions, tickets, prohibition orders, recall orders, detention orders for ships and EPCOs. The latter include injunctions, prosecutions and EPAMs.

## 10.1 Designations and Training

In 2008–2009, the total number of designated CEPA enforcement officers was 167, including 37 officers from the Environmental Emergencies Program.

Environment Canada continued the final year of a three-year project to redesign the Basic Enforcement Training program with a contracted law enforcement training facility. In 2008–2009, the program resulted in 38 newly designated officers with full enforcement officer powers and 3 emergency officers with limited enforcement powers.

In 2008–2009, two Limited Powers/Analyst Designation courses were delivered, resulting in 1 newly designated officer with limited powers and 20 newly designated CEPA analysts.

Other training accomplishments related to CEPA 1999 regulations in 2008–2009 included

- the development and delivery of a course to 33 officers on the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*;
- together with the U.S. Environmental Protection Agency, the delivery of a course to 56 officers on the *Off-Road Compression-Ignition Engine Emission Regulations*, the *Off-Road Small Spark-Ignition Engine Emission Regulations* and the *On-Road Vehicle and Engine Emission Regulations*;
- the provision of expertise for the development of the online course for the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*;
- the provision of expertise for the delivery of a course to 31 officers on the *PCB Regulations*; and
- the development of a course on the *Solvent Degreasing Regulations*.

## 10.2 Compliance Promotion

Compliance promotion relates to the planned activities that are undertaken to increase the awareness and understanding of the law and its regulations. Through these activities, information is provided on what is required to comply with the law, the benefits of compliance and the consequences of non-compliance.

Numerous compliance promotion activities were delivered for new and existing control instruments under CEPA 1999 in 2008–2009. Multiple approaches were used to reach the regulated communities, varying from mail-outs to information sessions, in collaboration with other federal departments, provinces or non-governmental organizations (e.g. Indian and Northern Affairs Canada, National Defence, the Conseil patronal de l'environnement du Québec, the

Canadian Chemical Producers' Association and other manufacturers' associations) when appropriate.

### 10.2.1 Collaboration with First Nations

The Ontario Region implemented a multi-year project to improve spill reporting and spill response at First Nations communities in Ontario. As part of this project, spill response posters were developed and distributed. To meet the needs of non-English-speaking communities, the posters were translated into Cree and Oji-Cree. Since the initiation of this project, spill reporting rates by Ontario First Nations have improved significantly.

### 10.2.2 Multi-instrument Compliance Promotion

Environment Canada organizes a number of multi-instrument workshops each year to reach regulatees who must comply with more than one regulation. A multi-instrument workshop was organized by the Quebec Region in March 2009, in conjunction with two chemicals sector associations. The half-day workshop provided information on a number of subjects, such as Parts 5 and 6 of CEPA 1999, the Chemicals Management Plan, the *Environmental Emergency Regulations*, and the *Ozone-Depleting Substances Regulations, 1998*. Nearly 100 people took part in this workshop.

In September 2008, Environment Canada hosted a compliance promotion session in Sydney, Nova Scotia, for organizations involved in the Sydney Tar Ponds and Coke Ovens remediation project. This session provided the regulated community and other government organizations with the opportunity to meet with Environment Canada staff and learn about CEPA 1999 and its regulations. Participants were also provided with details on the responsibilities and authority of Environment Canada's wildlife and environmental enforcement offices. Participants included representatives from the Sydney Tar Ponds Agency, Public Works and Government Services Canada, Nova Scotia Environment and the consulting community.

### 10.2.3 Activities on Individual CEPA Instruments

Compliance promotion activities on individual CEPA 1999 control instruments in 2008–2009 included the following:

- *PCB Regulations* — Four PCB fact sheets were developed and distributed to the regulated community in Canada. A promotional tool explaining the mechanics and functioning of the new electronic portal for PCB reporting was developed and sent to the regulated community.
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* — Following the making of these new regulations in June 2008, compliance promotion officers in the regions initiated a range of compliance promotion activities. Preparatory work to create effective information sessions was undertaken in 2008–2009. The information sessions are designed to assist regulatees in meeting regulatory obligations and will be delivered across Canada in the next fiscal year. The information sessions will target federal departments (such as the Department of National Defence, and Indian and Northern Affairs Canada) as well as First Nations.
- *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* — Several information sessions were held across Canada including two in the Pacific and Yukon Region to promote compliance with the specific requirements in the Regulations for companies shipping wastes from Alaska through Canadian waters off the west coast of Canada. The sessions were attended by hazardous waste generators, management companies and carriers involved in the transit of hazardous waste from Alaska to mainland United States. Additional activities included a mass mailing of two brochures.
- *Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations* — A mailing containing annual report forms and information was sent in February 2009 to regulatees in each region. Under the regulations, regulatees are required to provide an annual report to Environment Canada. Reminder postcards were also sent to approximately 1800 dry cleaners country-wide.
- New substances notification regulations — Environment Canada had a booth at Growing Beyond Oil, the 5th Canadian Renewable Fuels Summit, in the National Capital Region, December 1–3, 2008. The summit, with

over 350 registrants, was attended by representatives of Canadian and international industry, governmental regulators, industry associations, industry partners and service providers. Numerous information packages were distributed. In addition, compliance promotion fact sheets on the *New Substances Notification Regulations (Chemicals and Polymers)* and the *New Substances Notification Regulations (Organisms)* were mailed to approximately 800 regulatees across the country, who were identified on the basis of sector-specific North American Industry Classification System codes. The Ontario Region worked with enforcement headquarters to create a pilot version of the New Substances Notification E-learning tool for the public, which will be posted on the website.

- *Environmental Emergency Regulations* — The Ontario and Atlantic Regions conducted compliance promotion site visits to individual regulatees to promote understanding of the Regulations and gain an understanding of the level of quality of Environmental Emergency Plans needed to determine the future direction for these Regulations. The Quebec Region held three technical workshops across the province for industry, municipalities and other government departments. The Atlantic Region held an Ammonia and Chlorine Workshop for regulatees.
- Notice with respect to reporting of information on air pollutants, greenhouse gases and other substances for the 2008 calendar year — In spring 2008, several compliance promotion initiatives were undertaken, resulting in a high response rate from all sectors covered by the Notice. An initial assessment of the quality of the data submissions was performed in the fall of 2008, which resulted in a first round of official communication with certain companies by Environment Canada officials to clarify submissions of concern and to gather missing information.
- Notice with respect to reporting of greenhouse gases — The compliance promotion activities for this section 46 notice consisted of contacting past reporters and potential reporters through email and the distribution of guidance material. The total number of reporting facilities climbed from 324 in the initial reporting year (2005) to 350 in 2008, representing approximately 39% of Canada's total emissions.
- *On-Road Vehicle and Engine Emission Regulations* — A guidance document, *Subfleet Averaging and End of Model Year Reporting Requirements for On-Road Motorcycles*, was developed in April 2008 (www.ec.gc.ca/ceparegistry/documents/regs/NOx781/781_NOx.cfm). The document provides guidance to motorcycle manufacturers and importers on the subfleet averaging requirements of the Regulations. In addition, a report was published in July 2008, which summarizes the regulatory requirements, the fleet average nitrogen oxide emission performance of light-duty vehicle manufacturers and importers (e.g. passenger cars, light-duty trucks), and the overall Canadian fleet for the 2006 model base year (www.ec.gc.ca/ceparegistry/documents/regs/NOx2006/toc.cfm). A guidance document explaining what is required as evidence of conformity for light-duty vehicles subject to the Regulations was drafted and consultations were conducted. The draft guidance document, *Submission Requirements for Evidence of Conformity for Light-Duty Vehicles, Light-Duty Trucks and Medium-Duty Passenger Vehicles in Relation to the On-Road Vehicle and Engine Emission Regulations Made under the Canadian Environmental Protection Act, 1999*, was distributed to associations representing regulatees as part of specific compliance promotion activities.
- National Pollutant Release Inventory — The NPRI program updated and published the *Guide to Reporting to the NPRI* manual in March 2009. This guide assists the public in understanding and complying with the NPRI reporting requirements for 2008. An NPRI brochure, *National Pollutant Release Inventory 2008 – Are you required to report?*, was mailed out to members of the public who may have to report to the NPRI and was published on the NPRI website in March 2009 (www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=208A760B-1).

## 10.3 Enforcement Priorities

In past years, a National Inspection Plan described the inspection activities that would be carried out that fiscal year under CEPA 1999. In 2008–2009, the plan was retitled as the National Enforcement Plan and expanded to include investigation and intelligence functions. The number of inspections carried out under the plan is supplemented by a large number of inspections resulting from responses to spills, complaints, intelligence or other information.

Factors that influence the identification of priority regulations include the risk to the environment and human health represented by the regulated substance or activity, compliance rates, new and amended regulations, nature of the regulatory provisions, operational complexity and capacity, and domestic and international commitments. In 2008–2009, the National Enforcement Plan identified the following CEPA 1999 regulations as national priorities:

- *Solvent Degreasing Regulations*; and
- *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*.

A number of other regulations were identified as regional inspection priorities.

## 10.4 Enforcement Activities

### 10.4.1 Enforcement Statistics

Table 14 summarizes the inspections, investigations and enforcement measures undertaken in 2008–2009.

**Table 14. Summary of inspections, investigations and enforcement measures from April 2008 to March 2009**

| CEPA Tool | Inspections | | | Enforcement Measures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Inspections | Off-site Inspections | On-site Inspections | Investigations | Written Warnings | Directions | Tickets | EPCOs | EPAMs | Charges | Prosecutions | Convictions |
| **Regulations** | | | | | | | | | | | | |
| *Asbestos Mines and Mills Release* | 12 | | 12 | | | | | | | | | |
| *Benzene in Gasoline* | 149 | 121 | 28 | 1 | 23 | | | | | | | |
| *Chlor-Alkali Mercury Release* | 1 | 1 | | | | | | | | | | |
| *Contaminated Fuel* | 1 | | 1 | | | | | | | | | |
| *Disposal at Sea* | 55 | 23 | 32 | 4 | 3 | | | 4 | | | | |
| *Environmental Emergency* | 85 | 27 | 58 | | 135 | | | | | | | |
| *Export and Import of Hazardous Waste and Hazardous Recyclable Material* | 694 | 149 | 545 | 9 | 126 | | | 6 | | 3 | 1 | |
| *Export Control List Notification* | 1 | 1 | | | | | | | | | | |
| *Export of Substances under the Rotterdam Convention* | | | | | | | | | | | | |
| *Federal Halocarbon, 2003* | 507 | 321 | 186 | 1 | 151 | | | 12 | | | | |
| *Federal Mobile PCB Treatment and Destruction* | | | | | | | | | | | | |
| *Fuels Information, No. 1* | 207 | 198 | 9 | | 2 | | 4 | | | 2 | 1 | |
| *Gasoline* | 55 | 52 | 3 | | | | | | | | | |
| *Gasoline and Gasoline Blend Dispensing Flow Rate* | | | | | | | | | | | | |
| *Interprovincial Movement of Hazardous Waste* | 24 | 11 | 13 | 1 | | | | | | | | |
| *New Substances Notification (Chemicals and Polymers)* | 35 | 6 | 29 | 1 | 2 | | | | | | | |
| *New Substances Notification (Organisms)* | 15 | 1 | 14 | | 3 | | | | | | | |
| *Off-Road Compression-Ignition Engine Emission* | 12 | | 12 | | 15 | | | | | | | |
| *Off-Road Small Spark-Ignition Engine Emission* | 14 | 2 | 12 | 3 | 19 | | | | | | | |
| *On-Road Vehicle and Engine Emission* | 2 | | 2 | | 3 | | | | | | | |

**Table 14. (Concluded)**

| CEPA Tool | Inspections | | | Enforcement Measures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Inspections | Off-site Inspections | On-site Inspections | Investigations | Written Warnings | Directions | Tickets | EPCOs | EPAMs | Charges | Prosecutions | Convictions |
| *Ozone-depleting Substances, 1998* | 101 | 52 | 49 | 2 | 10 | | | | | | | |
| *PCB* | 253 | 169 | 84 | 1 | 26 | | | 1 | | | | |
| *PCB Waste Export* | | | | | | | | | | | | |
| *PCB Waste Export, 1996* | | | | | | | | | | | | |
| *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds* | | | | | | | | | | | | |
| *Phosphorus Concentration* | | | | | | | | | | | | |
| *Polybrominated Diphenyl Ethers* | | | | | | | | | | | | |
| *Prohibition of Certain Toxic Substances, 2005* | 1 | 1 | | | | | | | | | | |
| *Pulp and Paper Mill Defoamer and Wood Chip* | 44 | 35 | 9 | | | | | | | | | |
| *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans* | 111 | 102 | 9 | | | | | | | | | |
| *Secondary Lead Smelter Release* | 2 | 1 | 1 | | | | | | | | | |
| *Solvent Degreasing* | 51 | 14 | 37 | 1 | 18 | | | | | | | |
| *Storage Tank Systems for Petroleum Products and Allied Petroleum Products* | 14 | 5 | 9 | | | | | | | | | |
| *Sulphur in Diesel Fuel* | 281 | 192 | 89 | | 13 | | | | | | | |
| *Sulphur in Gasoline* | 104 | 66 | 38 | | 1 | | | | | | | |
| *Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements)* | 1032 | 703 | 329 | 8 | 409 | | | 117 | | 3 | 2 | 4 |
| *Vinyl Chloride Release, 1992* | 7 | 7 | | | | | | | | | | 1 |
| **Other Tools*** | | | | | | | | | | | | |
| CEPA 1999 – Section(s) | 530 | 246 | 284 | 10 | 87 | | | 5 | | 19 | 3 | 3 |
| Glycol Guidelines | | | | | | | | | | | | |
| National Pollutant Release Inventory | 91 | 65 | 26 | 1 | 51 | | | | | | | |
| Section 46 Notices – Greenhouse Gases | 64 | 64 | | | 1 | | | | | | | |
| Section 56 Notices – P2 Plan | 47 | 28 | 19 | | 7 | | | | | | | |
| Section 71 Notices – Toxics | 3 | 2 | 1 | | 1 | | | | | | | |
| **Total** | **4605** | **2665** | **1940** | **35** | **1106** | **0** | **4** | **145** | **0** | **27** | **7** | **8** |

## Explanatory Notes:

* Includes activities related to enforceable provisions of CEPA 1999.

Number of inspections — The number of inspections for compliance completed during the fiscal year, by regulation.

Number of investigations — The number of investigations started in the fiscal year. The total number of investigations is the number of investigation files started in the fiscal year. An investigation file may include activities relating to another law or to more than one regulation. Therefore, the total number of investigations shown does not add up to the total number of investigations by regulation.

All enforcement measures (except for prosecutions and EPAMs) are tabulated at the section level of a regulation. For example, if the outcome of an inspection is the issuance of a written warning that relates to alleged violations of three sections of a given regulation, the number of written warnings is three.

Number of prosecutions — The number of regulatees who were prosecuted, regardless of the number of regulations involved.

Number of EPAMs — The number of regulatees who signed EPAMs, regardless of the number of regulations involved.

**Additional Statistics:**

There were 134 referrals to other federal, provincial or municipal government departments.

Of the 35 investigations started in 2008–2009, 6 ended in 2008–2009 and 29 are ongoing. In addition, of 43 investigations started before 2008–2009, 5 were completed in 2008–2009 and 37 are ongoing.

### 10.4.2 Environmental Protection Compliance Orders

EPCOs may help secure an alleged violator's return to compliance, without use of the court system.

In 2008–2009, 156 EPCOs were issued: 117 under the *Off-Road Compression-Ignition Engine Emission Regulations* and the remaining 39 for violating various other CEPA regulations.

### 10.4.3 Environmental Protection Alternative Measures

An EPAM agreement is an enforcement tool that allows for a negotiated return to compliance without a court trial. If an EPAM agreement is successfully negotiated, it is filed with the court and is a public document. The agreement must also be published on the CEPA Environmental Registry.

No EPAM agreements were made in 2008–2009.

### 10.4.4 Prosecutions and Court Cases

Key prosecutions and court cases in 2008–2009 included the following:

- A British Columbia company was ordered to pay a penalty of $17,500 ($2,500 fine and $15,000 to the Environmental Damages Fund) after pleading guilty to one count of illegally importing hazardous waste in violation of CEPA 1999.
- A Nova Scotia company was ordered to pay a penalty of $10,000 ($2,000 fine and $8,000 to the Environmental Damages Fund) after pleading guilty to illegally disposing of dead slime eels at sea without an ocean disposal permit.
- An Ontario company was convicted on two counts of violating CEPA 1999 and the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. The company was fined $5,000 on each count and the total fine of $10,000 was directed to the Environmental Damages Fund.

## 10.5 Domestic and International Actions

Enforcement-related activities are carried out under various international and domestic agreements and organizations. In 2008, the Commission for Environmental Cooperation's Enforcement Working Group began the "Non-Compliant Imports Entering North America" project, which identifies non-compliant engines subject to on-road vehicle and engine emission regulations in member countries (Canada, United States and Mexico). The project is intended to identify and respond to non-compliant imports through cooperation, information sharing and operational support and has resulted in the initiation of several enforcement cases that are currently being investigated.

# Appendix A Contacts

Further information on CEPA 1999 and related activities can be found online at

- CEPA Environmental Registry website (www.ec.gc.ca/ceparegistry);
- Environment Canada's website (www.ec.gc.ca); and
- Health Canada's website (www.hc-sc.gc.ca).

Departmental publications are available from the departmental library or the nearest regional library. Many departmental publications are also available online at www.ec.gc.ca/publications or through Environment Canada's Inquiry Centre:

Inquiry Centre
Environment Canada
351 St. Joseph Boulevard
Place Vincent Massey, 8th Floor
Gatineau QC K1A 0H3

Telephone: 819-997-2800 or 1-800-668-6767
Fax: 819-994-1412
TTY: 819-994-0736
(Teletype for the hearing impaired)
Email: enviroinfo@ec.gc.ca

The following communications contacts are also available to provide additional information:

Environment Canada
Media Relations
Toll-free within Canada: 1-888-908-8008
Outside Canada: 1-819-934-8008
Email: media@ec.gc.ca

Health Canada
Media Relations
Telephone: 613-957-2983
Fax: 613-952-7747
Email: info@hc-sc.gc.ca
Address Locator 0900C2
Ottawa ON K1A 0K9

For information about the role of the *Canada Gazette*, how to subscribe to the print version or how to comment on proposed regulations before enactment, consult the *Canada Gazette* website at www.gazette.gc.ca or contact *Canada Gazette* general inquiries:

Email: info.gazette@pwgsc-tpsgc.gc.ca
Telephone: 613-996-1268
Toll-free: 1-866-429-3885
TTY: 1-800-926-9105
Fax: 613-991-3540

# Appendix B List of Acronyms

| | |
|---|---|
| CHPD | Propanedinitrile, [[4-[[2-(4-cyclohexylphenoxy)ethyl] ethylamino]-2-methylphenyl]methylene]- |
| DSL | Domestic Substances List |
| EPAMs | Environmental Protection Alternative Measures |
| EPCOs | Environmental Protection Compliance Orders |
| NAPS | National Air Pollution Surveillance Network |
| NPRI | National Pollutant Release Inventory |
| PAHs | polycyclic aromatic hydrocarbons |
| PBDEs | polybrominated diphenyl ethers |
| PCBs | polychlorinated biphenyls |
| POPs | persistent organic pollutants |

# Appendix C Draft and Final Assessment Decisions of Chemicals Management Plan Challenge Substances

**Table 15. Assessment decisions of Batches 1 through 5 under the Chemicals Management Plan Challenge from April 2008 to March 2009**

***(NFA = no further action; SNAc = Significant New Activity Notice; VE = virtual elimination)***

| Substance | Meets Criteria of s.64 | Proposed Measure | Draft Notice | Final Notice |
|---|---|---|---|---|
| **Batch 1** | | | | |
| 1,2-Benzenediol | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| 1,4-Benzenediol | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| 2-Naphthalenecarboxamide, 4-[[5-[[[4-(aminocarbonyl)phenyl]amino]carbonyl]-2-methoxyphenyl]azo]-N-(5-chloro-2,4-dimethoxyphenyl)-3-hydroxy- | No | NFA | 19-Jan-08 | 5-Jul-08 |
| 2-Naphthalenecarboxamide, N-[4-(acetylamino)phenyl]-4-[[5-(aminocarbonyl)-2-chlorophenyl]azo]-3-hydroxy- | No | NFA | 19-Jan-08 | 5-Jul-08 |
| Benzene, 1,3-diisocyanato-2-methyl | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| Benzene, 1,3-diisocyanatomethyl- | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| Benzene, 2,4-diisocyanato-1-methyl | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| Benzenesulfonic acid, 4-[[3-[[2-hydroxy-3-[[(4-methoxyphenyl)amino]carbonyl]-1-naphthalenyl]azo]-4-methylbenzoyl]amino]-, calcium salt (2:1) | No | NFA | 19-Jan-08 | 5-Jul-08 |
| Naphthalene | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| Oxirane, ethyl- | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| Oxirane, methyl- | Yes (64(*c*)) | Add to Schedule 1 | 19-Jan-08 | 5-Jul-08 |
| Peroxide, (1,1,4,4-tetramethyl-1,4-butanediyl)bis[(1,1-dimethylethyl) | No | NFA | 19-Jan-08 | 5-Jul-08 |
| Peroxide, (1,1,4,4-tetramethyl-2-butyne-1,4-diyl)bis[(1,1-dimethylethyl) | No | NFA | 19-Jan-08 | 5-Jul-08 |
| Peroxide, (3,3,5-trimethylcyclohexylidene)bis[(1,1-dimethylethyl) | No | NFA | 19-Jan-08 | 5-Jul-08 |
| Propanedinitrile, [[4-[[2-(4-cyclohexylphenoxy)ethyl]ethylamino]-2-methylphenyl]methylene]- | Yes (64(*a*)) | Add to Schedule 1 and VE | 19-Jan-08 | 5-Jul-08 |
| **Batch 2** | | | | |
| 1,3-Butadiene, 2-methyl- | Yes (64(*c*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |
| 9,10-Anthracenedione, 1,4-bis[(4-methylphenyl)amino]-, sulfonated, potassium salts | No | NFA | 17-May-08 | 31-Jan-09 |
| Acetic acid ethenyl ester | No | NFA | 17-May-08 | 31-Jan-09 |
| Benzene, 1,3-bis(1-isocyanato-1-methylethyl)- | No | NFA | 17-May-08 | 31-Jan-09 |
| Benzenesulfonic acid, [(9,10-dihydro-9,10-dioxo-1,4-anthracenediyl)bis(imino-4,1-phenyleneoxy)]bis-, disodium salt | No | SNAc/NFA | 17-May-08 | 31-Jan-09 |
| Benzenesulfonic acid, 2,2 -[(9,10-dihydro-5,8-dihydroxy-9,10-dioxo-1,4-anthracenediyl)diimino]bis[5-(1,1-dimethylethyl)-, disodium salt | No | SNAc/NFA | 17-May-08 | 31-Jan-09 |
| Benzenesulfonic acid, 3,3'-[(9,10-dihydro-9,10-dioxo-1,4-anthracenediyl)diimino]bis[2,4,6-trimethyl-, disodium salt | No | NFA | 17-May-08 | 31-Jan-09 |
| C.I. Pigment Red 104 | Yes (64(*c*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |
| C.I. Pigment Yellow 34 | Yes (64(*c*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |

**Table 15. (Continued)**

| Substance | Meets Criteria of s.64 | Proposed Measure | Draft Notice | Final Notice |
|---|---|---|---|---|
| Cyclopentasiloxane, decamethyl | Yes (64(*a*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |
| Cyclohexasiloxane, dodecamethyl- | No | NFA | 17-May-08 | 31-Jan-09 |
| Cyclotetrasiloxane, octamethyl- | Yes (64(*a*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |
| Oxirane, (chloromethyl)- | Yes (64(*c*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |
| Phenol, 2,4,6-tris(1,1-dimethylethyl)- | Yes (64(*a*)) | Add to Schedule 1 and VE | 17-May-08 | 31-Jan-09 |
| Phenol, 4,4 -(1-methylethylidene)bis- | Yes (64(*a*)&(*c*)) | Add to Schedule 1 | 19-Apr-08 | 18-Oct-08 |
| Spiro[isobenzofuran-1(3H),9'-[9H]xanthen]-3-one, 2',4',5',7'-tetrabromo-3',6'-dihydroxy- | No | NFA | 17-May-08 | 31-Jan-09 |
| Thiourea | Yes (64(*c*)) | Add to Schedule 1 | 17-May-08 | 31-Jan-09 |
| **Batch 3** | | | | |
| Benzenesulfonamide, N-(4-amino-9,10-dihydro-3-methoxy-9,10-dioxo-1-anthracenyl)-4-methyl- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 9,10-Anthracenedione, 1-hydroxy-4-[[4-[(methylsulfonyl)oxy]phenyl]amino]- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 2-Naphthalenol, 1-[(4-methyl-2-nitrophenyl)azo]- | Yes (64(*c*)) | Add to Schedule 1 | 23-Aug-08 | 7-Mar-09 |
| 2-Naphthalenol, 1-[(2-chloro-4-nitrophenyl)azo]- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 2-Naphthalenol, 1-[(2,4-dinitrophenyl)azo]- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 2-Naphthalenol, 1-[(2-nitrophenyl)azo]- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 2-Naphthalenol, 1-[(4-chloro-2-nitrophenyl)azo]- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 2-Naphthalenecarboxamide, N-(5-chloro-2,4-dimethoxyphenyl)-4-[[5-[(diethylamino)sulfonyl]-2-methoxyphenyl]azo]-3-hydroxy- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 2-Anthracenesulfonic acid, 4,4'-[(1-methylethylidene)bis(4,1-phenyleneimino)]bis[1-amino-9,10-dihydro-9,10-dioxo-, disodium salt | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 9,10-Anthracenedione, 1,8-dihydroxy-4-nitro-5-(phenylamino)- | No | NFA | 23-Aug-08 | 7-Mar-09 |
| Peroxide, [1,3(or 1,4)-phenylenebis(1-methylethylidene)]bis[(1,1-dimethylethyl) | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 1-Propanaminium, 3-[[4-[(2,4-dimethylphenyl)amino]-9,10-dihydro-9,10-dioxo-1-anthracenyl]amino]-N,N,N-trimethyl-, methylsulfate | No | SNAc/NFA | 23-Aug-08 | 7-Mar-09 |
| Benzenesulfonic acid, 3-[[4-amino-9,10-dihydro-9,10-dioxo-3-[sulfo-4-(1,1,3,3-tetramethylbutyl)phenoxy]-1-anthracenyl]amino]-2,4,6-trimethyl-, disodium salt | No | NFA | 23-Aug-08 | 7-Mar-09 |
| 9,10-Anthracenedione, 1-[(5,7-dichloro-1,9-dihydro-2-methyl-9-oxopyrazolo[5,1-b]quinazolin-3-yl)azo]- | No | SNAc/NFA | 23-Aug-08 | 7-Mar-09 |
| Ethanol, 2-methoxy-, acetate | Yes (64(*c*)) | Add to Schedule 1 | 23-Aug-08 | 7-Mar-09 |
| Ethanol, 2-ethoxy-, acetate | No | SNAc/NFA | 23-Aug-08 | 7-Mar-09 |
| Ethanol, 2-(2-methoxyethoxy)- | Yes (64(*c*)) | Add to Schedule 1 | 23-Aug-08 | 7-Mar-09 |
| 1-Propanol, 2-methoxy- | Yes (64(*c*)) | Add to Schedule 1 | 23-Aug-08 | 7-Mar-09 |
| 9,10-Anthracenedione, 1-amino-4-(phenylamino)- | No | SNAc/NFA | 23-Aug-08 | 7-Mar-09 |
| **Batch 4** | | | | |
| 2-Butanone, 4-[[[1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-(1-methylethyl)-1-phenanthrenyl]methyl](3-oxo-3-phenylpropyl)amino]-, [1R-(1α,4aβ,10aα)]- | No | SNAc/NFA | 24-Jan-09 | |
| 5HDibenz[b,f]azepine-5-propanamine, 3-chloro-10,11-dihydro-N, Ndimethyl-,monohydrochloride | No | NFA | 24-Jan-09 | |

**Table 15. (Continued)**

| Substance | Meets Criteria of s.64 | Proposed Measure | Draft Notice | Final Notice |
|---|---|---|---|---|
| Adenosine, N-benzoyl-5'-O-[bis(4-methoxyphenyl) phenylmethyl]-2'-deoxy | No | SNAc/NFA | 24-Jan-09 | |
| Amines, C18-22-tert-alkyl, ethoxylated (ATAE) | No | SNAc/NFA | 24-Jan-09 | |
| Amines, tallow alkyl, ethoxylated, phosphates (ATAEP) | No | NFA | 24-Jan-09 | |
| Amines,C18-22-tert-alkyl, (chloromethyl)phosphonates (2:1) | No | NFA | 24-Jan-09 | |
| Benzamide, 3,5-dichloro-N-(3,4-dichlorophenyl)-2-hydroxy-(3,3',4',5-tetrachlorosalicylanilide) | No | SNAc/NFA | 24-Jan-09 | |
| Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene | Yes (64(*a*)) | Add to Schedule 1 and VE | 24-Jan-09 | |
| Benzoic acid, 2-[(3,5-dibromo-4-hydroxyphenyl)(3,5-dibromo-4-oxo-2,5-cyclohexadien-1-ylidene)methyl]-, ethyl ester | No | SNAc/NFA | 24-Jan-09 | |
| Butane | n/a | Screening assessment | 24-Jan-09 | |
| Hexane | No | NFA | 24-Jan-09 | |
| Isobutane | n/a | Screening assessment | 24-Jan-09 | |
| Phenol, 4,4'-(3H-2,1-benzoxathiol-3-ylidene)bis[2-bromo-6-methyl-, S,S-dioxide | No | NFA | 24-Jan-09 | |
| Phenol,4,4'-(3H-2,1-benzoxathiol-3-ylidene)bis[2,5-dimethyl-, S,S-dioxide | No | NFA | 24-Jan-09 | |
| Phenol,4,4'-(3H-1,2-benzoxathiol-3-ylidene)bis[2,6-dibromo-3-methyl-,S,S-dioxide, monosodium salt | No | NFA | 24-Jan-09 | |
| Phenol,4,4'-(3H-2,1-benzoxathiol-3-ylidene)bis[2,6-dibromo-, S,S-dioxide | No | NFA | 24-Jan-09 | |
| Sulfuric acid, diethyl ester | Yes (64(*c*)) | Add to Schedule 1 | 24-Jan-09 | |
| Sulfuric acid, dimethyl ester | Yes (64(*c*)) | Add to Schedule 1 | 24-Jan-09 | |
| **Batch 5** | | | | |
| 2-Propenamide | Yes (64(*c*)) | Add to Schedule 1 | 21-Feb-09 | |
| Acetamide, 2-chloro- | No | SNAc/NFA | 21-Feb-09 | |
| Acetamide, N,N-dimethyl- | No | NFA | 21-Feb-09 | |
| Acetamide, N-[2-[(2-bromo-4,6-dinitrophenyl)azo]-5-(diethylamino)phenyl]- | No | NFA | 21-Feb-09 | |
| Acetamide, N-[5-[[2-(acetyloxy)ethyl](phenylmethyl)amino]-2-[(2,4-dinitrophenyl)azo]-4-methoxyphenyl]- | No | NFA | 21-Feb-09 | |
| Acetamide, N-[5-[[2-(acetyloxy)ethyl](phenylmethyl)amino]-2-[(2-chloro-4,6-dinitrophenyl)azo]-4-methoxyphenyl]- | No | NFA | 21-Feb-09 | |
| Acetamide, N-[5-[bis[2-(acetyloxy)ethyl]amino]-2-[(2-bromo-4,6-dinitrophenyl)azo]-4-ethoxyphenyl]- | No | NFA | 21-Feb-09 | |
| Benzamide, N-[5-[bis[2-(acetyloxy)ethyl]amino]-2-[(4-nitrophenyl)azo]phenyl]- | No | NFA | 21-Feb-09 | |
| Benzenamine, 4-[(2,6-dichloro-4-nitrophenyl)azo]-N-(4-nitrophenyl)- | No | NFA | 21-Feb-09 | |
| Ethanol, 2,2'-[[3-chloro-4-[(2,6-dichloro-4-nitrophenyl)azo]phenyl]imino]bis- | No | NFA | 21-Feb-09 | |
| Ethanol, 2,2'-[[4-[(2,6-dibromo-4-nitrophenyl)azo]phenyl]imino]bis-, diacetate (ester) | No | NFA | 21-Feb-09 | |
| Ethanol, 2,2'-[[4-[(2-bromo-6-chloro-4-nitrophenyl)azo]-3-chlorophenyl]imino]bis- | No | NFA | 21-Feb-09 | |
| Ethanol, 2-[[4-[(2,6-dichloro-4-nitrophenyl)azo]phenyl]methylamino]- | No | SNAc/NFA | 21-Feb-09 | |
| Ethanol, 2-chloro-, phosphate (3:1) | Yes (64(*c*)) | Add to Schedule 1 | 21-Feb-09 | |

**Table 15. (Concluded)**

| Substance | Meets Criteria of S.64 | Proposed Measure | Draft Notice | Final Notice |
|---|---|---|---|---|
| Formamide | No | NFA | 21-Feb-09 | |
| Phosphoric acid tributyl ester | No | NFA | 21-Feb-09 | |
| Propanamide, N-[5-[bis[2-(acetyloxy)ethyl]amino]-2-[(2-chloro-4-nitrophenyl)azo]phenyl]- | No | NFA | 21-Feb-09 | |
| Propanenitrile, 3-[[2-(acetyloxy)ethyl][4-[(2,6-dichloro-4-nitrophenyl)azo]phenyl]amino]- | No | NFA | 21-Feb-09 | |
| Propanenitrile, 3-[[4-[(2,6-dibromo-4-nitrophenyl)azo]phenyl]ethylamino]- | No | NFA | 21-Feb-09 | |

www.ec.gc.ca

Additional information can be obtained at:

Environment Canada
Inquiry Centre
351 St. Joseph Boulevard
Place Vincent Massey, 8th Floor
Gatineau QC  K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-997-2800
Fax: 819-994-1412
TTY: 819-994-0736
Email: enviroinfo@ec.gc.ca