Canada's National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants

May 2006

Government of Canada / Gouvernement du Canada

Canada

Library and Archives Canada Cataloguing in Publication

Main entry under title:
Canada's National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants.

Issued also in French under title:
Plan national de mise en oeuvre du Canada au titre de la Convention de Stockholm sur les polluants organiques persistants

Available also on the Internet

ISBN 0-662-42780-7
Cat. no.: En84-39/2006E
EPSM-718

1. Persistent pollutants--Government policy--Canada.
2. Organic compounds--Government policy--Canada.
3. Hazardous substances--Law and legislation--Canada.
4. Stockholm Convention on Persistent Organic Pollutants (2001).
5. Pollution prevention--Canada.
6. Environmental monitoring--Canada.

I. Canada. Environment Canada.
II. Title.

HC120.E5C36 2006 363.738'46'0971 C2006-980039-1

Canada's National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants

Published by:
Environment Canada

Project manager:
Greg Filyk, Environment Canada

Creative design and production:
Graphics Plus+ www.graphicsplus.ca

Multistakeholder consultation facilitators:
Ann Hewitt, Anacapa Consulting Services, Inc.
Phil Nicholson, J. Phillip Nicholson Policy and Management Consultants, Inc.

This publication should be cited as follows:
Government of Canada, 2006. Canada's National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants; Ottawa, Ontario, Canada.

Cover photos:
© COREL Corporation, 1994
Photos are used with permission

This publication is available at:
1) Stockholm Convention on persistent organic pollutants: www.pops.int/
2) Environment Canada, Clean Air Online website: www.ec.gc.ca/cleanair-airpur/default.asp?lang=En&n=8DDE4B39-1
3) Copies of this publication may be obtained free of charge at:

Environment Canada
Transboundary Air Division
Place Vincent Massey Building – 11th Floor
351 St. Joseph Boulevard
Gatineau, Québec K1H 0H3

For general information or to provide comments, please contact the Environment Canada Inquiry Centre at: www.ec.gc.ca/inqry_e.html or send an email to: enviroinfo@ec.gc.ca

Canada's National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants

May 2006

Government of Canada
Gouvernement du Canada

Canada

ACKNOWLEDGEMENTS

Project Management:

Greg Filyk, Environment Canada.

Writing and editing:

Part I: Greg Filyk and Ann Hewitt (Anacapa Consulting Services, Inc.) under the direction of Cheryl Heathwood, Environment Canada.

Part II: Sarah Ternan, Ed Wituschek, Rosanna Esposito, Lindsay Pratt and Ken Smith, under the direction of Patrick Finlay, Environment Canada.

Contributors:

The preparation of this document took place over many months. Numerous individuals took time to provide input, review various drafts and provide comments and suggestions. In particular, thanks to the following people for their efforts:

Environment Canada: Cathy Banic, Robert Chénier, Ken De, Danie Dubé, Suzanne Easton, Tom Harner, Brenda Koekkoek, Josée Lanctot, Francine Laperriere, Diane Sullivan, Lyne Monastesse, David Niemi, Julie Carriere and Joe Wittwer.

Canadian International Development Agency: Ellen Hagerman.

Foreign Affairs Canada: Jean-Louis Wallace, Denis Langlois.

Health Canada: Lars Juergensen, Shalini Gupta.

Indian and Northern Affairs Canada: Russel Shearer, David Stone, Jason Stow.

Industry Canada: Gary McGee.

Justice Canada / Environment Canada: Anne Daniel.

Special thanks to representatives of Aboriginal communities, environmental non-governmental organizations (NGOs) and industry groups who actively participated throughout the development of the national implementation plan and provided thoughtful input and recommendations:

Aboriginal: Stephanie Meakin, Inuit Circumpolar Conference; Chris Paci, Athabaskan Arctic Council; Alan Penn, Grand Council of the Crees;

Environmental NGOs: Fe De Leon, Canadian Environmental Law Association / Canadian Environmental Network ; and

Industry: Gordon Lloyd, Canadian Chemical Producers' Association.

Consultation participants:

Finally, thanks to the many others who participated in multi-stakeholder and jurisdictional consultations and/or provided their expertise to this project:

Aboriginal Representatives: Maggie Julian, Assembly of First Nations; Keith Maguire, Council of Yukon First Nation; Sheila Watt-Cloutier, Inuit Circumpolar Conference.

Academic Representatives: Drew Loso, York University; Michelle Loso, Carleton University; Tanya Neima, Carleton University; Amy Seabrook, Dalhousie University.

Environmental Non-governmental Organization Representatives: Delores Broten, Reach for Unbleached!; David Browne, Urban Ecology Centre; David Coon, Conservation Council of New Brunswick; Derek Coronado, Citizens Environment Alliance; Vijay Cuddeford, World Wildlife Fund; Rick Findlay, Pollution Probe; David Fletcher, Green Coalition; Michel Gaudet, The Coalition for Alternatives to Pesticides; John Jackson, Great Lakes United; Gabrielle Kretzschmar, New Brunswick Partners in Agriculture; Andrea Moher, Canadian Environmental Law Association; Paul Muldoon, Canadian Environmental Law Association; Judy Parkman, R.O.A.R.; Anna Tilman, STORM Coalition;James W. White, Ecology Action Centre.

Health Non-governmental Organization Representatives: Sandra Boswell, Allergy and Environmental Illness Group; Timothy Lambert, Canadian Public Health Association; Jim Orr, Canadian Institute of Child Health; Dorothy Goldin Rosenberg, Women's Healthy Environments Network; Franca Ursitti, Ontario Public Health Association; Jean Zigby, Canadian Association of Physicians for the Environment.

Industry Sector Representatives: Bruce Boyd, Canadian Steel Producers Association; Victoria Christie, Canadian Electricity Association; Denis Kemp, Noranda Inc./Falconbridge Limited; Judy Shaw, Syngenta Crop Protection Canada Inc.; David Short, Dow Canada; Alvin Bortnick, Canadian Steel Producers Association; Scott Campbell, Canadian Chamber of Commerce; Roger Cook, Forest Products Association of Canada; Martin Guy, Domtar Inc.; Amy Lo, Domtar Inc.; Brenda MacDonald, Nova Scotia Power Inc.; Peter MacLeod, Croplife Canada; Nancy McIntyre, Telus; Keith Murray, Alberta Forest Products Association; Bill Peel, ATCO Power Canada Ltd.; Lynne Ree, Canadian Steel Producers Association; Dean Thomson, Canadian Horticultural Council; Ken Tsang, Dow/Canadian Chemical Producers' Association; George Venta, Cement Association of Canada.

Provincial/Territorial Representatives: Randy Angle, Alberta Environment; Brent Baxter, Nova Scotia Environment and Labour; Lawrence Cheng, Alberta Environment; Bob Cornelius, Ontario Environment; Todd Fraser, Prince Edward Island Environment, Energy and Forestry; Peter Haring, Newfoundland and Labrador Environment and Conservation; Brian Levia, Yukon Territories Environment; John Mayor, Saskatchewan Environment; Randy Piercy, New Brunswick Environment; Guy Roy, Quebec Sustainable Development, Environment and Parks; Jean Van Dusen, Manitoba Conservation; Shannon Watt, British Columbia Environment; Graham Veale, Northwest Territories Environment and Conservation.

Environment Canada officials: Birgit Braune, Neil Burgess, Terry Bidleman, Diane Campbell, Philippe Chemouny, Tom Dann, Alain David, John Elliot, Nabila Elsaadi, Glen Fox, Noah Fuad, Sheila Gariepy, Alain Gosselin, Michael Hingston, Eric Hundert, Wilfred Jan, Markus Kellerhals, Frank Letchford, Jean-Francois Levasseur, Drew MacDonald, Christopher Marshall, Derek Muir, Martin Mullan, Josée Portugais, Shelly Roy, Kamuran Sadar, Pete Schwarzhoff, Jody Sunstrum, Joana Talafre, Josée Trudel, Richard Turle, Srinivasan Venkatesh, Chip Weseloh, Anita Wong.

Health Canada official: Kelly Butler.

LIST OF ACRONYMS

AAC	Arctic Athabaskan Council
ACAP	Arctic Council Action Plan on Pollution
ACIA	Arctic Climate Impact Assessment
AEPS	Arctic Environmental Protection Strategy
AMAP	Arctic Monitoring and Assessment Programme
BAT	best available techniques
BEP	best environmental practices
CACAR	Canadian Arctic Contaminants Assessment Report
CAIPAP	Canadian Arctic Indigenous Peoples Against POPs
CCME	Canadian Council of Ministers of the Environment
CCMS	Committee on the Challenges of Modern Society
CEAA	*Canadian Environmental Assessment Act*
CEC	Commission for Environmental Cooperation
CEN	Canadian Environmental Network
CEPA	1988 *Canadian Environmental Protection Act*
CEPA 1999	*Canadian Environmental Protection Act, 1999*
CIDA	Canadian International Development Agency
COP	Conference of the Parties to the Stockholm Convention
COP-1	First Conference of the Parties to the Stockholm Convention
CSA	Canadian Standards Association
CWS	Canada-wide Standard(s)
DDD	1,1-dichloro-2,2-bis(*p*-chlorophenyl) ethane
DDE	1,1-dichloro-2,2-bis(chlorophenyl) ethylene
DDT	dichlorodiphenyltrichloroethane; 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane
DSL	Domestic Substances List
EAFs	electric arc furnaces
EPA	Environmental Protection Agency (United States)
FCM	Federation of Canadian Municipalities
GAPS	Global Atmospheric Passive Sampling
GDP	gross domestic product
GEF	Global Environment Facility
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
HAPs	hazardous air pollutants
HCB	hexachlorobenzene
HCH	hexachlorocyclohexane
IADN	Integrated Atmospheric Deposition Network
ICC	Inuit Circumpolar Conference
IFCS	Intergovernmental Forum on Chemical Safety
IISD	International Institute for Sustainable Development
INC	Intergovernmental Negotiating Committee
IOMC	Inter-Organization Programme on the Sound Management of Chemicals
IPCS	International Programme on Chemical Safety
ITEQ	international toxic equivalence units
LRTAP	Long-range Transboundary Air Pollution
NAAEC	North American Agreement on Environmental Cooperation
NAFTA	North American Free Trade Agreement
NAP	National Action Plan on Unintentionally Produced POPs
NAPS	National Air Pollution Surveillance
NARAP	North American Regional Action Plan
NATO	North Atlantic Treaty Organization
NCSCS	National Classification System for Contaminated Sites

LIST OF ACRONYMS (CONTINUED)

NCP	Northern Contaminants Program
NEI	Northern Ecosystem Initiative
NGOs	non-governmental organizations
NIP	National Implementation Plan
NOx	nitrogen oxides
NPRI	National Pollutant Release Inventory
OECD	Organisation for Economic Co-operation and Development
PAHs	polycyclic aromatic hydrocarbons
PBBs	polybrominated biphenyls
PCBs	polychlorinated biphenyls
PCDDs	polychlorinated dibenzo-*p*-dioxins
PCDFs	polychlorinated dibenzofurans
PCP	pentachlorophenol
PCPA	*Pest Control Products Act*
PCTs	polychlorinated terphenyls
PIC	prior informed consent
PM	particulate matter
PMRA	Pest Management Regulatory Agency (Health Canada)
PMTS	Policy for the Management of Toxic Substances (CCME)
POPs	persistent organic pollutants
ppb	parts per billion
ppm	parts per million
RAIPON	Russian Association of Indigenous Peoples of the North
SOx	sulphur oxides
TCDD	tetrachlorodibenzo-*p*-dioxin
TEF	toxic equivalence factor
TSMP	Toxic Substances Management Policy (federal government)
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UPOPs	unintentionally produced persistent organic pollutants
VOCs	volatile organic compounds
WHO	World Health Organization

EXECUTIVE SUMMARY

Autumn Leaves

Photo by: Hemera © Statistics Canada, 2003

The purpose of this National Implementation Plan (NIP) is to inform the Conference of the Parties (COP) and the public about how the obligations of the Stockholm Convention on Persistent Organic Pollutants (POPs) will be implemented in Canada. The NIP is written to fulfil the Article 7 obligation stating that each Party must develop and endeavour to implement a plan for the implementation of its obligations and to transmit this plan to the COP within two years following entry into force for it. For Canada, the transmittal date is by May 17, 2006. As also specified in Article 7, Canada will conduct periodic reviews and updates of the NIP in accordance with schedules to be determined by the COP. Article 5 of the Convention stipulates that the NIP include a National Action Plan (NAP) for reducing emissions of unintentionally produced POPs (UPOPs). Accordingly, the NAP forms Part II of this document.

POPs are chemicals that are persistent, bio-accumulative and subject to long-range transport in the environment and cause adverse effects on human health or the environment. The 12 POP chemicals initially listed in the Stockholm Convention are among the most dangerous toxic substances because they do not break down easily in the environment and they accumulate in living organisms. POPs are a concern to human health because of their propensity to accumulate over a lifetime and to be passed on from one generation to the next, mainly through the placenta to the fetus and through breast milk to the nursing infant.

POPs are a significant concern in Canada's North, where they are carried through long-range transport by atmospheric and ocean currents and are trapped in the "Arctic sink." Aboriginal northerners are particularly susceptible because they depend on traditional country food that may contain POPs. Scientific evidence shows that levels of polychlorinated biphenyls (PCBs) in the blood of some Inuit women are higher than Health Canada guidelines, and levels of certain POPs in breast milk of Inuit women have been found to be up to nine times higher than in women who live in southern Canada.

These contaminants remain a concern across the country because concentrations of certain POPs in biota are even higher in southern regions than in northern Canada. In particular, POPs tend to accumulate in the freshwater regions of the Great Lakes and St. Lawrence basin and in the cold lakes of the Canadian Shield; in marine ecosystems along Canada's coasts; and in Canadian alpine regions. However, because most Canadians do not depend on fish and wildlife as significant food sources, health risks are lower in southern Canada.

As demonstrated in the NIP, Canada has played a leadership role in POPs, both domestically and internationally. In the 1970s, early research in the Great Lakes and later in the Arctic helped to understand the POPs problem, demonstrating the impacts of POPs on the environment and human health. Canada helped draw attention to the global nature of the problem and the need for international action. Canada played a leadership role in the development and initial implementation of the Stockholm Convention. When negotiations were completed, Canada was the first country to sign and ratify the new treaty in May 2001. Canada continues as a leading nation on POPs science, monitoring, assessment, control technologies and policies.

As a result of domestic actions, the majority of POPs entering Canada's environment now come from foreign sources. Continued domestic actions are important to further reduce levels of POPs and to address emerging chemical issues. At the same time, effective implementation by all Parties to the Stockholm Convention is of vital interest to Canada because it will reduce exposure to foreign sources of POPs that are adversely impacting the health and environment of Canadians, especially Aboriginal northerners and their children.

Development of Canada's NIP was led by Environment Canada, the national lead agency for this purpose and focal point for the Convention, pursuant to Article 9. The NIP has been developed cooperatively with federal departments, in consultation with representatives of Canada's provinces and territories, northern Aboriginal organizations, industrial associations and businesses, and environmental and health non-governmental organizations, including organizations focusing on women's and children's health.

In 2001, the federal government analyzed Canada's ability to comply with the obligations as part of its decision to sign and ratify the Stockholm Convention, providing some of the early groundwork contributing to the NIP. The formal NIP development process began with three regional multistakeholder consultation meetings in early 2004. Based on comments received, a draft NIP was produced for additional public and multistakeholder consultation in early February 2005. The draft NIP was also shared for information and feedback with the first Conference of the Parties (COP-1) in May 2005.

The NIP was completed in 2006, following consideration of stakeholder comments received during 2004 and 2005 consultations and documented in appendices to the draft NIP. In addition, the NIP includes an appendix with case studies prepared by two northern Aboriginal organizations, demonstrating their effective contributions to the Stockholm Convention and international efforts to control POPs.

The NIP has been approved on behalf of the Government of Canada by the Honourable Rona Ambrose, Minister of the Environment. It has been posted on Environment Canada's Greenlane website, along with a document responding to stakeholder comments, and transmitted to the Convention's Secretariat.

Part I of the NIP demonstrates how Canada's federal, provincial and territorial policies, legislation, regulations and other instruments in place and planned will be used to implement the obligations of the Stockholm Convention. Canada has taken actions to eliminate the production, use, import and export of all of the intentionally produced chemicals under the Stockholm Convention. The registration of Stockholm Convention pesticides either never applied or was discontinued by the late 1990s. The industrial chemicals covered by the Convention are prohibited under Canadian environmental regulations. Proposed new regulations for PCBs will set specific deadlines for ending the use and storage of existing PCBs and monitor progress of their removal, consistent with the Convention.

As a result of actions taken from the 1970s through the 1990s, there are no stockpiles of POPs pesticides in Canada. Canada has open and transparent policies dealing with hazardous wastes, including domestic rules for the disposal of POPs waste, that are consistent with Stockholm Convention obligations and guidelines.

Canada provided concrete evidence of its support for financial capacity-building assistance even before the Convention was completed, establishing a $20 million Canada POPs Fund in 2000. This Fund remains available (as of May 2006, the date of this initial NIP) to assist capacity building in developing countries and countries with economies in transition. In addition, Canada will continue its participation in the Global Environment Facility, the primary interim funding mechanism for the Convention.

Moving forward, Canada will continue to take actions to further reduce releases of POPs and to deal with emerging chemical issues. Canada has a number of domestic programs dealing with research, development and monitoring of POPs, which contribute to international knowledge and capacity building and will assist reporting, effectiveness evaluation and nomination/review of candidate POPs. Canadian policy and legislation guide the assessment of existing and new chemical substances and provide for their assessment against criteria of persistence, bioaccumulation and toxicity. The recent domestic initiative categorizing 23 000 chemicals in commerce will give the information base needed to identify candidate POPs and support and/or review nominations to the Convention.

Part II of the NIP describes Canada's NAP addressing emissions of UPOPs. Under Article 5 of the Stockholm Convention, Parties are required to take measures to reduce total releases of by-product emissions of UPOPs from anthropogenic sources "with the goal of their continuing minimization and, where feasible, ultimate elimination."

The NAP identifies Canada's plans for meeting its obligations under Article 5 of the Stockholm Convention on POPs — namely, measures to reduce or eliminate releases from unintentional production of dioxins, furans, hexachlorobenzene and PCBs. The NAP presents information on current release inventories, laws and policies and the strategies that Canada has adopted in its domestic programs consistent with the Convention.

Finally, the NIP is intended to be flexible and will be reviewed and updated in future years to reflect the evolution of the Stockholm Convention and progress and results of Canadian policy. Canada plans to review and update the NAP and examine its success in meeting the obligations of Article 5 (a) of the Stockholm Convention on a five-year basis, also taking into account decisions of the COP and other factors of relevance.

PART - I

CANADA'S NATIONAL IMPLEMENTATION PLAN ON PERSISTENT ORGANIC POLLUTANTS (NIP)

Polar bear getting out of the water, Frobisher Bay, Nunavut

TABLE OF CONTENTS: PART I

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Inuit child

Health Canada Media Photo Gallery © Public Works and Government Services Canada, 2006

1.1 Purpose of Canada's National Implementation Plan (NIP) under the Stockholm Convention on Persistent Organic Pollutants (POPs)

The United Nations Environment Programme (UNEP) Stockholm Convention on Persistent Organic Pollutants (POPs)[1] is a global agreement that came into effect on May 17, 2004. The objective of this Convention is to protect human health and the environment from POPs. As a Party to the Convention, Canada has an obligation under Article 7 to develop and endeavour to implement a National Implementation Plan (NIP).

Note: Text that appears in blue shading (except that in square brackets) directly quotes the Convention text.

Article 7 (Implementation plans) states:

1. Each Party shall:
   (a) Develop and endeavour to implement a plan for the implementation of its obligations under this Convention;
   (b) Transmit its implementation plan to the Conference of the Parties within two years of the date on which this Convention enters into force for it; and
   (c) Review and update, as appropriate, its implementation plan on a periodic basis and in a manner to be specified by a decision of the Conference of the Parties.
2. The Parties shall, where appropriate, cooperate directly or through global, regional and subregional organizations, and consult their national stakeholders, including women's groups and groups involved in the health of children, in order to facilitate the development, implementation and updating of their implementation plans.
3. The Parties shall endeavour to utilize and, where necessary, establish the means to integrate national implementation plans for persistent organic pollutants in their sustainable development strategies where appropriate.

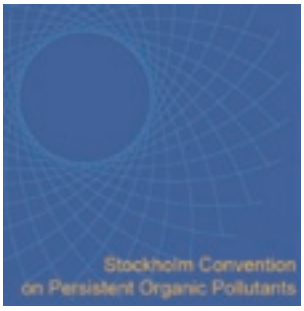
Parties to the Stockholm Convention are required to develop NIPs to demonstrate how the obligations of the Convention will be implemented.[2] Therefore, the purpose of Canada's NIP is to inform the Conference of the Parties and the public regarding Canada's initiatives, current and projected, to meet the requirements of the Stockholm Convention. These initiatives include legislation, regulations, voluntary programs and standards, policies, programs and other related measures, including actions by Canadians to manage and eliminate POPs in the environment. Article 5 of the Convention stipulates that the NIP include a National Action Plan (NAP) for reducing unintentionally produced POPs (UPOPs), including dioxins and furans, hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs). Accordingly, Part I of this document is Canada's NIP, and Part II is Canada's NAP.

Article 7(1)(b) of the Convention states that each Party must transmit its implementation plan to the Conference of the Parties within two years of the date on which this Convention enters into force for it. The Convention entered into force for Canada on May 17, 2004; therefore, Canada must submit this NIP in advance of May 17, 2006, Canada's deadline for submission. Canada will also conduct periodic reviews and updates of the NIP in accordance with schedules to be determined by the Conference of the Parties.

[1] www.pops.int

[2] United Nations Environment Programme, *Interim Guidance for Developing a National Implementation Plan for the Stockholm Convention*, Revised, December 2004 www.pops.int/documents/implementation/nips/guidance/guidances/docdirec_en.pdf

1.2 Overview of the Stockholm Convention



Courtesy of UNEP Stockholm Convention Secretariat

The Stockholm Convention is a global agreement developed under the auspices of UNEP. The objective of the Convention is to protect human health and the environment from POPs. The Convention:

- sets out obligations for countries covering the production, use, import, export, release and disposal of POPs;
- requires countries to promote, and in some cases require, the use of the best available techniques (BAT) and best environmental practices (BEP) to reduce and/or eliminate emissions of UPOPs from certain combustion and chemical processes; and
- includes provisions aimed at preventing the introduction of new POPs and for adding other POPs to the Convention in the future.

On May 23, 2001, Canada became the first country to sign and ratify the Stockholm Convention; 50 ratifications were required for its entry into force on May 17, 2004.

1.3 POPs

1.3.1 What are POPs?

POPs are persistent, bioaccumulative, subject to long-range transport in the environment and cause adverse effects on human health or the environment:

- **Persistence** – POPs are organic compounds of natural or anthropogenic origin with a particular combination of physical and chemical properties such that, once released into the environment, they remain intact for exceptionally long periods of time, as they resist photolytic, chemical and biological degradation.[3]
- **Bioaccumulative** – Characterized by low water solubility and high lipid solubility, POPs bioaccumulate in fatty tissues of living organisms, including humans, and are found at increased concentrations at higher levels in the food chain.
- **Long-range transport** – POPs are semivolatile chemicals that evaporate from the regions in which they are used or released and are then transported over long distances in the atmosphere. They are also discharged directly or by atmospheric deposition into waterways and are transported by movement of fresh and marine waters.
- **Adverse effects** – Even at the very low concentrations usually found in the environment, because they bioaccumulate in organisms, POPs can trigger a range of generally subtle effects on human health, as well as on fish and wildlife at the top of the food chain.

Annex D of the Stockholm Convention sets out the specific scientific criteria for each of these four characteristics, to help determine whether a chemical qualifies for consideration as a POP under the Convention.

1.3.2 Overview of the 12 POPs

By ratifying the Convention, Parties agree to the management and control of 12 POPs (sometimes known as the "dirty dozen") and to a formal process to consider adding additional substances to the Convention. The 12 POPs that were included when the Convention came into force fall into three broad categories: pesticides, industrial chemicals and UPOPs. The following description of the three broad categories is based upon UNEP's *Ridding the World of POPs: A Guide to the Stockholm Convention on Persistent Organic Pollutants* (2002) and provides the reader with a list of the substances and a summary of the key uses for each chemical (this is a summary only; other uses may exist or have existed in the past):

[3] Buccini, J., Implementing global action on persistent organic pollutants (POPs) under the Stockholm Convention: Issues and opportunities, Abstract, *Eco-informa 2001*, Environmental Risks and the Global Community, Strategies for Meeting the Challenges, Argonne National Laboratory, May 14–18, 2001.

Pesticides:

- **Aldrin** – A pesticide applied to soils to kill termites, grasshoppers, corn rootworm and other insect pests.
- **Chlordane** – Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops.
- **DDT** – Perhaps the best known of the POPs, DDT was widely used during World War II to protect soldiers and civilians from malaria, typhus and other diseases spread by insects. It continues to be applied against mosquitoes in several countries to control malaria.
- **Dieldrin** – Used principally to control termites and textile pests, dieldrin has also been used to control insect-borne diseases and insects living in agricultural soils.
- **Endrin** – This insecticide is sprayed on the leaves of crops such as cotton and grains. It is also used to control mice, voles and other rodents.
- **Heptachlor** – Primarily employed to kill soil insects and termites, heptachlor has also been used more widely to kill cotton insects, grasshoppers, other crop pests and malaria-carrying mosquitoes.
- **HCB** – HCB kills fungi that affect food crops. It is also an industrial chemical and can be released as an unintentional by-product of combustion processes.
- **Mirex** – This insecticide is applied mainly to combat fire ants and other types of ants and termites. Mirex is also an industrial chemical.
- **Toxaphene** – This insecticide, also called camphechlor, is applied to cotton, cereal grains, fruits, nuts and vegetables. It has also been used to control ticks and mites in livestock.

Industrial chemicals:

- **HCB** – HCB is used in the production of rubber, aluminium, munitions and dyes and in wood preservation and other manufacturing.
- **Mirex** – This chemical is used as a fire retardant in plastics, rubber and electrical goods.
- **PCBs** – These compounds are employed in industry as heat exchange fluids, in electric transformers and capacitors and as additives in paint, carbonless copy paper, sealants and plastics.

UPOPs:

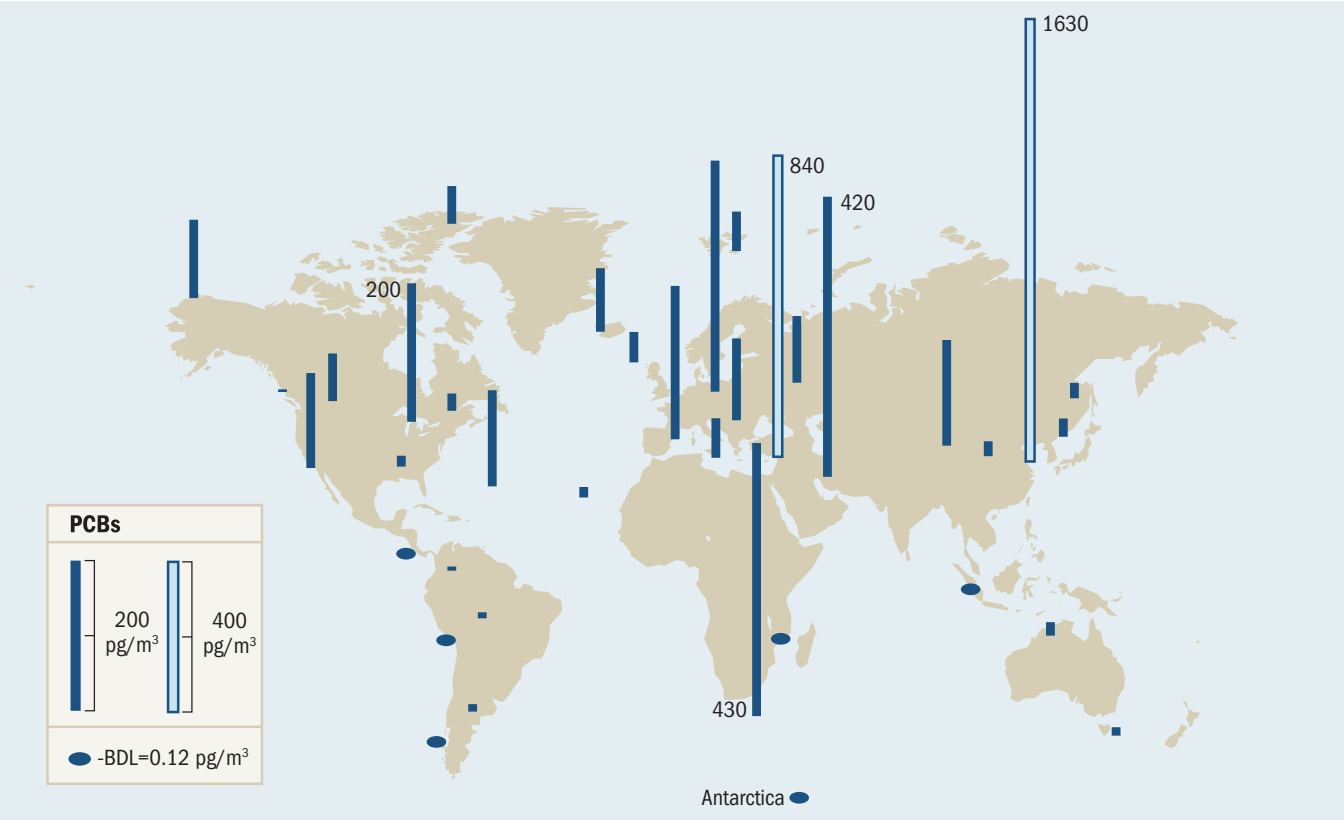
- **Dioxins** – These chemicals can be produced unintentionally due to incomplete combustion, as well as during the manufacture of certain pesticides and other chemicals. In addition, certain kinds of metal recycling and pulp and paper bleaching can release dioxins. Dioxins have also been found in automobile exhaust, tobacco smoke and wood and coal smoke.
- **Furans** – These compounds are produced unintentionally from the same processes that release dioxins, and they are also found in commercial mixtures of PCBs.
- **HCB** – HCB can be a by-product of the manufacture of industrial chemicals and is released as a result of certain combustion processes.
- **PCBs** – PCBs can be released as unintentional by-products of combustion processes.

1.3.3 Why are POPs a global issue?

POPs are a global issue for a number of reasons. First, they are found everywhere. They have been measured on every continent, at sites representing every major climatic zone and geographic region throughout the world. POPs have been found, on a global scale, in every environmental medium: air, water, soils, sediments, in aquatic and terrestrial animals, as well as in humans. They have been found even in remote regions, including the polar areas of both the hemispheres, where no significant local sources exist and the only reasonable explanation for their presence is long-range transport from other parts of the globe.[4] Figures 1-1 and 1-2 illustrate the widespread presence of POPs in the atmosphere, for the industrial chemical PCBs and the agricultural pesticide chlordane, respectively. Figure 1-3 shows key source regions of industrial and agricultural POPs and other contaminants.

[4] www.gpa.unep.org/bin/php/home/index.php

Figure 1-1: Global atmospheric concentrations of PCBs in winter 2005[a]



Source: Dr. Tom Harner, Environment Canada, 2006, personal communication.
Notes:
[a] Results of first period (January–March 2005) of Global Atmospheric Passive Sampling (GAPS) Study for PCBs (= sum of 49 congeners) in pg/m^3 at 50 surface monitoring sites around the globe.
BDL = Below detection limit of 0.12 pg/m^3.
pg = picogram = 1 trillionth of a gram.
Site locations for the GAPS Study are given in the following table.

Continent	Country	Location	Type[a]
Australasia	Australia	Cape Grim, Tasmania	BA
	Australia	Darwin, NT	RU
	Philippines	Quezon City, Metro Manila	UR
Asia	China	Dalian, Liaoning	BA
	China	Chengdu, Sichuan	UR
	China	Qingcheng, Sichuan	UR
	China	Harbin, Heilong Jiang	UR
	Kuwait	Kuwait	RU
Europe	Spain	Barcelona	UR
	Czech Republic	Košetice	BA
	Iceland	Stórhöfdi	BA
	Italy	Isld. Marettimo	RU
	Ireland	Malin Head	BA
	Poland	Gdańsk	RU
	Russian Federation	Danki	RU
	Turkey	Izmir	UR
	Norway	Ny Ålesund	BA
	Canary Island	Las Palmas[d]	RU
Africa	S. Africa	DeAar	BA
	S. Africa	Kalahari	BA
North America	Canada	Dorset, ON	BA
	Canada	Whistler, BC	BA
	Canada	Bratt's Lake, SK	AG
	USA	Barrow, Alaska	PO
	USA	Athens, Georgia	AG
	Canada	Alert, NWT	PO
	Canada	Toronto, ON	RU
	USA	Simi Valley, California	RU
Central America	Costa Rica	Tapanki National Park[b]	BA
	Bermuda	Bermuda	BA
South America	Argentina	Bahia Blanca	AG
	Bolivia	Potosi 1820 masl	RU
	Bolivia	Potosi 2600 masl	BA
	Bolivia	Potosi 5200 masl	BA
	Colombia	Arauca[c]	RU
	Chile North	Chungara Lake	BA
	Chile South	Patagonia	BA
Polar region	Antarctica	Italian Base	PO

Source: Dr. Tom Harner, Environment Canada, 2006, personal communication.
Notes:
[a] Site types: PO: polar; BA: Background; RU: rural; AG: agricultural; UR: urban.
[b] Tapanki National Park (NP) is located in the central region of Costa Rica, near San Jose city.
[c] Sede Arauca is 9 km from Arauca City, Colombia.
[d] Telde coastal zone (10 km South Las Palmas), Canary Island.

Figure 1-2: Global atmospheric concentrations of chlordane in winter 2005[a]

Source: Dr. Tom Harner, Environment Canada, 2006, personal communication.

Notes:

[a] Results of first period (January–March 2005) of Global Atmospheric Passive Sampling (GAPS) Study for chlordanes (sum of four isomers) in pg/m^3 at 50 surface monitoring sites around the globe.

BDL = Below detection limit of 0.2 pg/m^3.

pg = picogram = 1 trillionth of a gram.

Site locations for the GAPS Study are given in Table under Figure 1-1.

Figure 1-3: Global source regions of POPs

Source: *Canadian Arctic Contaminants Assessment Report II: Highlights*, Indian and Northern Affairs Canada, 2003, p. 13.

Second, both humans and environmental organisms are exposed to POPs around the world, in many cases for extended periods of time. POPs occur at low levels in air and water, so concerns arise from their ability to bioaccumulate in fatty tissue of organisms through the food chain, rather than from direct exposure. For most people, about 90% of overall exposure to POPs is through diet. Foods rich in animal fat, such as meats, fish and dairy products, are the most important sources of ingested POPs. People are exposed to multiple POPs during their lifetime, and most people today carry detectable background levels of a number of POPs in their bodies.

Third, POPs can cause a range of adverse effects in fish and wildlife, which have led to large population declines in some species (such as the Peregrine Falcon, see Section 1.3.4.3). A review of the effects of exposure to POPs on more than a dozen predator species (wildlife at the top of the food chain) in the Great Lakes, such as eagles, cormorants, trout, minks and turtles, found that all these species suffered significant health impacts, including population decline and reproductive dysfunction, eggshell thinning, metabolic changes, deformities and birth defects, cancers, behavioural changes, abnormally functioning thyroids and other hormone system dysfunction, immune suppression, feminization of males and masculinization of females.[5]

Fourth, POPs can cause human health effects, which can be triggered at extraordinarily low concentrations. A growing body of scientific evidence associates human exposure to individual POPs with cancer, neurobehavioural impairment, immune system biochemical alterations and possibly dysfunction, reproductive dysfunction, shortened period of lactation and diabetes. The mechanism for many of these effects appears to be through disruption of the human endocrine system, often during fetal development.[6,7] The latency period for POPs may be very long. Not only can there be many years between exposure and outcome in the exposed individual, but in some cases, effects occur in future generations.

Of major concern for human health is the effect of exposure to POPs on developing fetuses and young children, who, as has been clearly shown by scientific studies, are affected by contaminants at lower levels than for the general population. POPs can accumulate in human tissues and pass through the placenta to the fetus. Furthermore, POPs have been detected in the breast milk of women throughout the world. Therefore, pregnant women and nursing mothers can affect the health of their offspring through a diet elevated in contaminants such as POPs.[8]

Finally, there is an element of unfairness to POPs pollution. For example, an estimated 1.3 million tonnes of PCBs were produced worldwide between 1930 and 1993, approximately half of which took place in the United States and 97% of which were used in the northern hemisphere.[9] As summarized in the Stockholm Convention document "Ridding the World of POPs",

> *These chemicals were for the most part introduced and initially used by industrialized countries, yet the lasting consequences will be felt everywhere and can be especially damaging to poorer communities. Furthermore, wealthier countries were among the first to detect the dangers, to reduce use, and to start cleaning up the mess. Poorer nations, which adopted these toxic substances later, often lack the money and expertise to move on to alternatives and to clean up existing stockpiles and waste sites.*[10]

To address this global issue, the Stockholm Convention recognizes that solving the POPs problem will require international efforts, including provision by industrialized countries of technical and financial assistance to developing countries and countries with economies in transition to help them deal with their own POPs pollution.

---

[5] Results of a 1991 Canada–U.S. International Joint Commission literature review, summarized in World Federation of Public Health Associations, *Persistent Organic Pollutants and Human Health*, 2000. www.apha.org/wfpha/popsfinal1.pdf.

[6] World Federation of Public Health Associations, *Persistent Organic Pollutants and Human Health*, 2000. www.apha.org/wfpha/popsfinal1.pdf

[7] Fisher, B.E., Most unwanted: Persistent organic pollutants, *Environmental Health Perspectives*, Vol. 107, No. 1, January 1999.

[8] Ontario Ministry of the Environment, *Guide to Eating Ontario Sport Fish 2005–2006*, 23rd Edition, Revised, 2005.

[9] Breivik, K., Sweetman, A., Pacyna, J.M. and Jones, K.C., Towards a global historical emission inventory for selected PCB congeners – a mass balance approach. 1. Global production and consumption, *Science of the Total Environment*, Vol. 290, pp. 181–198, 2002.

[10] United Nations Environment Programme, *Ridding the World of POPs: A Guide to the Stockholm Convention on Persistent Organic Pollutants*, April 2005. www.pops.int/documents/guidance/beg_guide.pdf

1.3.4 Why are POPs a Canadian issue?

POPs are semivolatile chemicals. After their release into the environment, they travel in multiple cycles of evaporation, transportation by air and condensation. Called the "cold condensation" or "grasshopper" effect (Figure 1-4), this process allows POPs to travel great distances. For remote locations and locations distant from regions where there are significant human-made sources of industrial, by-product or agricultural chemicals (i.e., the vast majority of Canada's landmass and aquatic and coastal ecosystems), this long-range atmospheric transport of POPs often forms the most significant or only source of POP contamination. For example, it is estimated that over 90% of the PCBs in Lake Superior enter via the atmosphere; and Canada's Arctic region, where POPs have been found, is located thousands of kilometres from agricultural land where POP pesticides such as DDT and toxaphene might be applied. In the cooler climate of the Arctic, low evaporation rates trap POPs in the "Arctic sink."

1.3.4.1 POPs in Canada's North

POPs are an issue for Canadian human health, particularly for Canada's northern Aboriginal communities. Three groups of Aboriginal peoples are found in Canada's Arctic region, totalling 56 000 people (53% of the Canadian Arctic population): the Inuit, the Métis and the First Nations, which in the Arctic include Dene and Yukon First Nations. The Inuit live in Nunavut Territory, Nunavik (in northern Quebec) and Nunatsiavut (in Labrador) and in the Inuvialuit Settlement Region in the Northwest Territories. Yukon First Nations live in 14 First Nations throughout the Yukon. The Dene live in five regions of the Northwest Territories, in an area known to them as Denendeh. Métis people also live primarily in Denendeh. Maps in Appendix A (Figures A-1 and A-2) show the northern Aboriginal regions and communities.

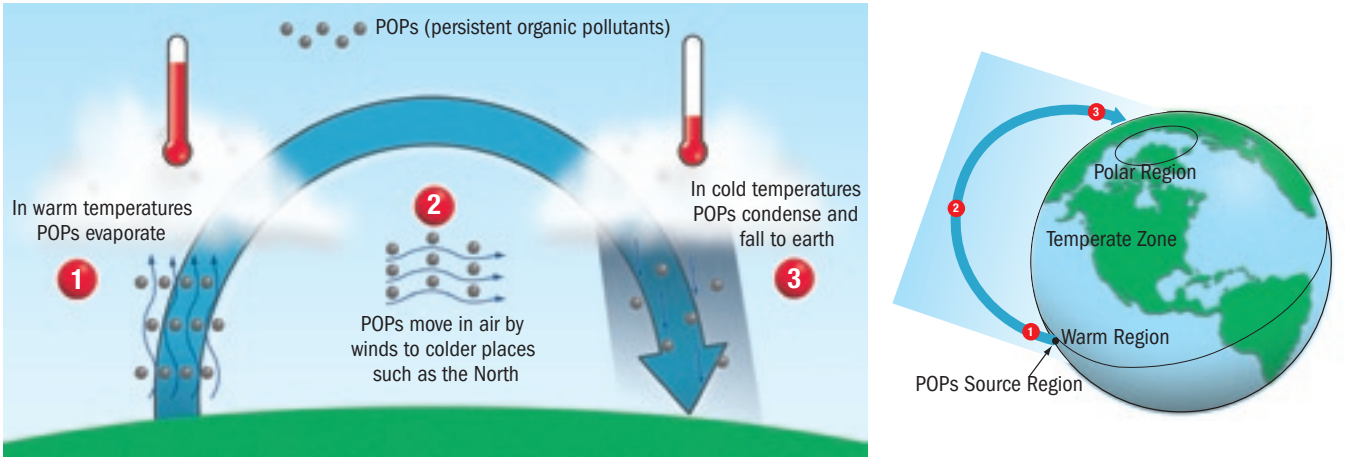
> The terms "Aboriginal peoples" and "Indigenous peoples" are generally used to describe the descendants of Canada's original inhabitants. For consistency, "Aboriginal" is the primary term used in this document.

The geographic location and socioeconomic activities of Aboriginal northerners make them particularly susceptible, because they eat "country food" that may contain POPs. Country food is food that northern Aboriginals traditionally harvest from the land, especially wildlife such as seal, whale, caribou and fish. These foods are an important part of the northern diet and culture, and research consistently demonstrates the benefits of traditional dietary practices to the health and well-being of northern Canadians:

> The terms "country food" and "traditional food" have the same meaning for the purposes of this document.

Many traditional/country foods help people fight illness, injury and disease better than the popular market foods and provide the necessary dietary intake of most vitamins, essential

Figure 1-4: The grasshopper effect



Source: *Canadian Arctic Contaminants Assessment Report II: Highlights*, Indian and Northern Affairs Canada, 2003, p. 15.

elements and minerals. Harvesting traditional/country food is physically demanding and helps people stay fit. There are significant social, cultural and spiritual benefits to harvesting, preparing, sharing and consuming these foods.[11]

The Inuit are the most highly exposed peoples in the North, because their traditional foods include marine mammals with a high fat content, such as seal, narwhal, whale, walrus and polar bear (see Table A-1 in Appendix A). In contrast, Dene, Métis and Yukon First Nations of the western Arctic have lower exposure to POPs, well below Health Canada and World Health Organization guideline levels of concern. Their traditional diet is based on freshwater fish (such as whitefish and trout) and terrestrial mammals (such as caribou and moose). These animals are less fatty and are usually associated with shorter food chains, limiting the biomagnification of POPs (Figure 1-5).

The primary POPs of concern for traditional/country foods are PCBs, chlordane and toxaphene. Inuit mothers have the highest levels of PCBs compared with Caucasians, Dene and Métis, with similar patterns observed for chlordane, toxaphene, HCB and mirex[12] (see Figures 1-6 and 1-7). Scientific evidence shows that levels of PCBs in the blood of some Inuit women are higher than Health Canada guidelines, and levels of certain POPs in breast milk of Inuit women have been found to be up to nine times higher than in women who live in southern Canada.

Inuit hunter pulling seal out of water

Inuit Community Feast

1.3.4.2 POPs in other regions of Canada

The majority of Canadians (i.e., those not consuming a traditional/country diet and/or large amounts of sports fish, wildlife or marine mammals) are currently exposed to POPs in food below levels associated with health risks, and to lower levels than several years ago. Three examples illustrate this point, based on recent results from separate studies by Health Canada:

- The average daily dietary intake of PCBs is estimated to be less than 0.5 mg, levels that are unlikely to cause adverse health effects.[13]
- PCB levels in wild and farmed salmon are well below the Health Canada guideline of 2 ppm and therefore are not considered to pose a risk to humans.[14]

The Health Canada guideline of 2 ppm is consistent with guidelines established by the U.S. Food and Drug Administration (FDA) and the World Health Organization (WHO).

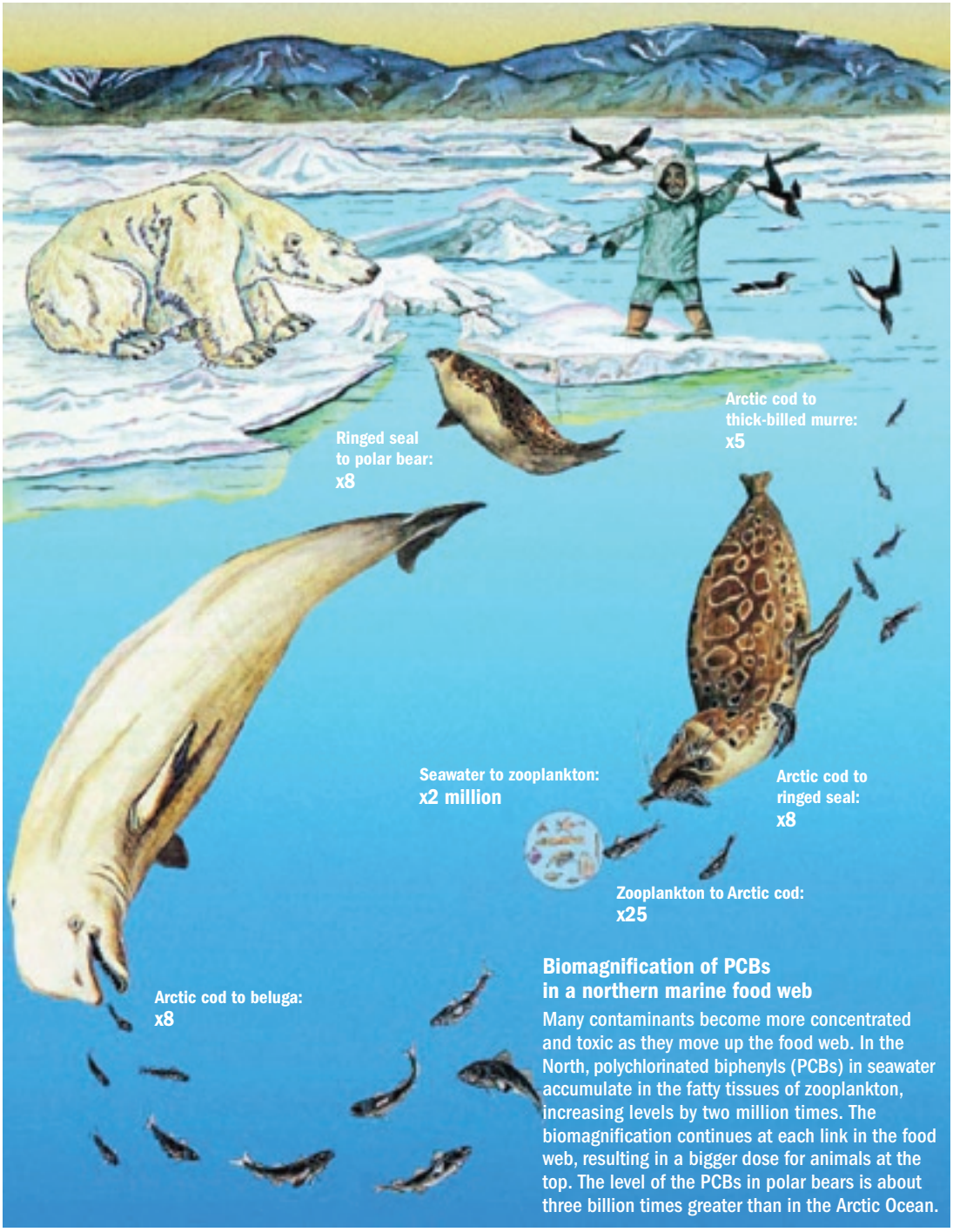
[11] *Canadian Arctic Contaminants Assessment Report II: Highlights*, Indian and Northern Affairs Canada, 2003, p. 13.

[12] *Canadian Arctic Contaminants Assessment Report II: Human Health*, Indian and Norhtern Affairs Canada, 2003, p.96.

[13] Health Canada, *It's Your Health*, PCBs. www.hc-sc.gc.ca/iyh-vsv/environ/pcb-bpc_e.html

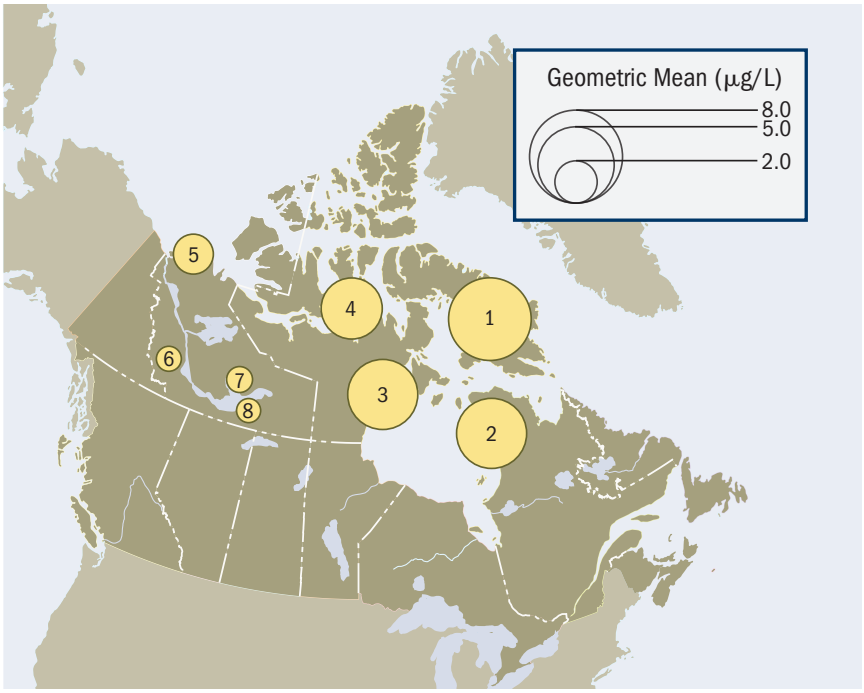
[14] Health Canada, *Q's & A's on PCBs in Salmon and Food Safety*, January 12, 2004. www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2004/2004_pcb-bpcbk1_e.html

Figure 1-5: Biomagnification of PCBs in a northern marine food web



Source: *Canadian Arctic Contaminants Assessment Report II: Highlights*, Indian and Northern Affairs Canada, 2003, p. 36.

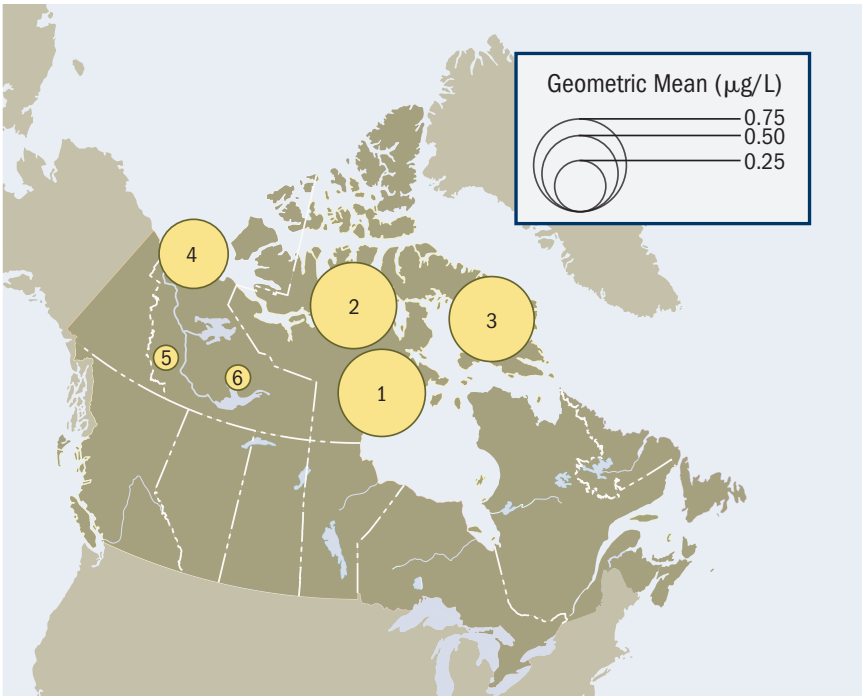
Figure 1-6: Levels of PCBs in maternal blood in Arctic Canada: PCBs (as Aroclor 1260)(µg/L plasma)



1	8.0 µ g/L	Inuit – Baffin
2	6.0 µ g/L	Inuit – Nunavik
3	5.6 µ g/L	Inuit – Kivalliq
4	4.5 µ g/L	Inuit – Kitikmeot
5	2.4 µ g/L	Inuit – Inuvik
6	1.3 µ g/L	Dene/Métis
7	1.3 µ g/L	Caucasian
8	1.1 µ g/L	Other

Source: *Canadian Arctic Contaminants Assessment Report II: Human Health*, Indian and Northern Affairs Canada, 2003, p. 19

Figure 1-7: Levels of toxaphene in maternal blood in Arctic Canada: Total toxaphene (µg/L plasma)



1	0.74 µ g/L	Inuit – Kivalliq
2	0.68 µ g/L	Inuit – Kitikmeot
3	0.59 µ g/L	Inuit – Baffin
4	0.43 µ g/L	Inuit – Inuvik
5	0.07 µ g/L	Dene/Métis
6	0.05 µ g/L	Caucasian

Source: *Canadian Arctic Contaminants Assessment Report II: Human Health*, Indian and Northern Affairs Canada, 2003, p. 16

Many jurisdictions in North America have consumption restrictions on sport fish. For example, the maximum recommended number of meals per month of sport fish caught in the province of Ontario is eight (based on an average meal size of 227 grams, or 8 ounces, for an average-size adult weighing 70 kg). Consumption advice is provided for more than 1700 locations in the province, based on levels of mercury and POPs (PCBs, mirex, DDT, dioxins and toxaphene) found in sport and game fish.

Source: Ontario Ministry of the Environment, *Guide to Eating Ontario Sport Fish 2005–2006.*

- Studies in two Canadian cities showed that the average dietary intake of dioxins, furans and similar substances was 0.62 pg per kilogram of body weight per day. This is below the "tolerable" level (meaning no serious health effects are expected) of roughly 2.3 pg per kilogram of body weight per day.[15]

The Joint Expert Committee on Food Additives, an expert group of the World Health Organization and the Food and Agriculture Organization of the United Nations, has established a "tolerable monthly intake" level for dioxins, furans and similar substances of 70 pg per kilogram of body weight. This is roughly equivalent to 2.3 pg per kilogram of body weight per day. A picogram (pg) is one-trillionth of a gram.

Despite the lower health risks in southern Canada, POPs remain a concern across the country and are not solely a northern issue.

First, concentrations of certain POPs in biota are even higher in southern regions than in northern Canada. In particular, POPs tend to accumulate in the freshwater regions of the Great Lakes and St. Lawrence basin, in the cold lakes of the Canadian Shield and in marine ecosystems along Canada's coasts. For example, concentrations of contaminants found in the tissues of beluga whale populations in the St. Lawrence River system are significantly higher than those measured in Arctic beluga populations, with PCB and DDT levels 25 times higher and mirex levels 100 times higher.[16] Pacific killer whales off the coast of British Columbia have been found to be highly contaminated with PCBs, with levels surpassing those found in St. Lawrence beluga whales by a factor of two to three times. In fact, the killer whales of British Columbia can be considered among the most contaminated cetaceans (whales and dolphins) in the world. While tissue levels of PCBs in killer whales are estimated to be three to four times lower than those of 30 years ago, high levels are expected to persist for several decades. Contaminant concentrations in human residents of these regions are less than those observed in the North, because species from these ecosystems are not significant food sources.

In the coastal waters of British Columbia, average PCB levels in male transient killer whales exceed 250 mg/kg and in southern resident killer whales, 145 mg/kg.

Source: Ross, P., *Endocrine-disrupting Effects of POPs in Free-ranging Pacific Killer Whales*, Health Canada Toxic Research Substances Initiative

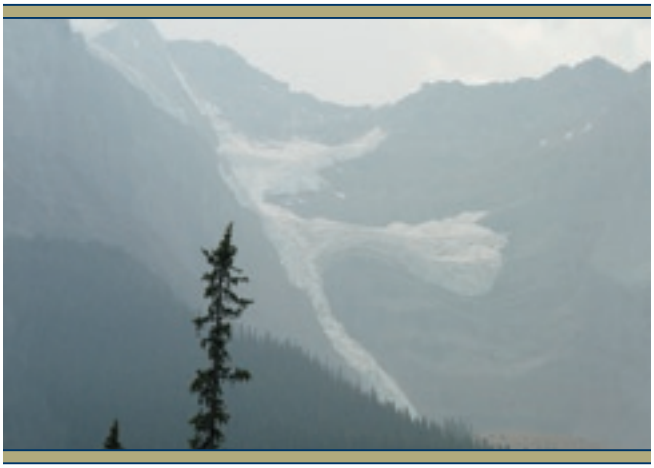
Killer Whale

[15] Health Canada, *It's Your Health, Dioxins and Furans*. www.hc-sc.gc.ca/iyh-vsv/environ/dioxin_e.html

[16] www.whales-online.net/eng/FSC.html?sct=2&pag=2-1-3

Second, POPs are found in Canadian alpine regions and the downstream ecosystems receiving alpine snow and/or glacial melt-water. Canadian scientists conducting research in the pristine Rocky Mountains parks of western Canada determined that POPs pesticides (such as DDT, chlordane and dieldrin) accumulate in cold alpine regions with high snowfalls, and that POP concentrations increase in precipitation and ice with increasing elevations. Results from these studies and others carried out on glaciers and ice fields on northern Ellesmere Island in Canada's high Arctic suggest that glacial melt-water will release significant quantities of POP pesticides into some alpine and northern marine coastal aquatic ecosystems for decades and perhaps centuries. These releases may contribute to the high level of POPs known to occur in fish from glacier-fed lakes, such as lake trout, and could pose a threat to the health of people and wildlife that feed on these fish. [17]

Johnston Canyon, Athabaska Glacier, Alberta



Third, there is a long-term concern in all regions of Canada because of the propensity for some POPs to accumulate over a lifetime and to be passed on from one generation to the next, mainly through the placenta to the fetus and through breastmilk to the nursing infant. Social changes may further influence this concern. For example, the proportion of women who are delaying childbearing to later in life has increased markedly in Canada in recent years.[18] Since older women have had a longer period of time to be exposed to and to accumulate POPs in their bodies, their infants potentially have greater exposures to these contaminants, both in the womb and through breastfeeding, as a result of increased maternal body burdens.[19]

Fourth, some POPs, such as dioxins and furans, are not produced intentionally but are created as by-products. Releases of these POPs to the environment can be controlled and reduced, but never entirely eliminated, because they are created by certain chemical processes, including burning, both human-made (e.g., municipal and medical waste incineration, open burning of wastes, iron and steel production, tobacco smoke) and natural (e.g., forest fires, volcanic eruptions). Canada is taking measures to reduce releases of by-product POPs from human-made sources, which is the subject of Part II of this document. As a result, the 2003 inventory shows a 60% decrease since 1990 in the overall release of dioxins and furans from sources within Canada. Also, the levels of dioxins and furans in Canadian human milk, which were already low, went down by roughly 50% between the 1980s and the 1990s.[20] It is expected that levels of dioxins and furans in Canadian emissions will continue to decline towards the goal of virtual elimination from human-made sources with the implementation of ongoing pollution prevention and control activities.

Peregrine Falcon

[17] Environment Canada, National Water Research Institute, Glaciers pass pollutants to aquatic ecosystems, *Science and the Environment Bulletin*, May/June 2002.

[18] Health Canada, *Canadian Perinatal Health Report*, Ottawa, 2003. www.phac-aspc.gc.ca/publicat/cphr-rspc03/pdf/cphr-rspc03_e.pdf

[19] Government of Canada, *Children's Health and the Environment in North America: A First Report on Available Indicators and Measures. Country Report: Canada*, prepared for the North American Commission on Environmental Cooperation, 2006. www.cec.org/files/PDF/POLLUTANTS/CountryReport-Canada-CHE_en.pdf

[20] Health Canada, *It's Your Health, Dioxins and Furans*, www.hc-sc.gc.ca/iyh-vsv/environ/dioxin_e.html

1.3.4.3 Effectiveness of control actions in reducing levels of POPs in the environment

DDT and Peregrine Falcons

Many Canadians first became aware of the POPs issue in the early 1970s, as scientific evidence showed the harmful impacts of DDT on fish and wildlife species, such as the Peregrine Falcon. From 1946 to 1972, DDT was the most widely used agricultural insecticide in the world (global agricultural use of DDT is estimated to have been 2.6 million tonnes from 1950 to 1993.[21] At the same time, from about 1945, many Peregrine Falcon populations began suffering widespread, unprecedented declines, particularly in Europe and North America. Research studies found that the major cause was the presence in the environment of agricultural pesticides, especially POPs. In addition, Canadian falcons probably acquired contaminants on their wintering grounds in Central and South America and from prey that had migrated from those regions. Peregrine Falcons are at the top of the food chain, eating birds that may have eaten grain or insects containing pesticides. Falcon tissues accumulate pesticide residue levels many times higher than the levels in their prey species, causing eggshell thinning, egg breakage, reduced hatching success, reduced brood size and reduced breeding success.[22]

Beginning in the early 1970s, Canada began restricting and then eliminated the use of DDT and the other agricultural POPs. Complementary international actions have led to significant declines in global DDT use in agriculture, to about 40 000 tonnes in 1980 and 100 tonnes in 2000. These actions and recovery efforts (primarily captive breeding and release programs) have improved the peregrine's status. In 2000, more than 110 pairs of peregrines bred in southern Canada, over 300 pairs in Yukon and the Mackenzie valley in the Northwest Territories, and several thousand pairs across the Arctic. While Peregrine Falcons are currently designated as "threatened" by the Committee on the Status of Endangered Wildlife in Canada, POP contamination is no longer considered a major limiting factor for these birds.[23]

Double-crested cormorant chicks in nest

Concentrations of Stockholm Convention POPs in wildlife vary considerably among individual animals as well as among locations across the country. As a result of management actions initiated in the 1970s in Canada and certain other countries, concentration levels have significantly declined in Canadian biota from the 1970s to the late 1990s and today are generally less than half the levels of the 1970s. For example, concentrations of PCBs and DDT in the eggs of Double-crested Cormorants have declined across southern Canada since the early 1970s, with most gains made before 1990 followed by a slower rate of decline over the past decade (Figure 1-8). A similar pattern of decline in concentrations of these POPs is taking place in seabird eggs (Northern Fulmar and Thick-billed Murres) in Northern Canada (Figure 1-8). However, the persistence of these and other POPs

[21] *Canadian Arctic Contaminants Assessment Report II: Sources, occurence, trends and pathways in the physical environment*, Indian and Northern Affairs Canada, 1003, p. 65.

[22] Environment Canada, Canadian Wildlife Service, *Hinterland Who's Who*. www.hww.ca/hww2.asp?id=60

[23] Environment Canada, Canadian Wildlife Service. *Species at Risk*. www.speciesatrisk.gc.ca/default_e.cfm

in the environment continues to affect the health and well-being of wildlife species and humans. Scientists suspect that the lack of further concentration declines, despite the banning of these chemicals in Canada, results from long-range transport, the slow release of contaminant residues from bottom sediments and agricultural soils, and, in the case of PCBs, the release of PCBs from storage and dump sites as well as products still in use.[24]

Under the Stockholm Convention, DDT use is restricted to certain applications for public health, to control insects that carry such diseases as malaria and typhus. The Convention's objective is to phase out DDT completely as locally safe, effective and affordable alternatives become available to Parties.

Nothern Fulmar

© Garry Donaldson

As a result of domestic actions beginning in the 1970s, the majority of POPs entering Canada's environment now come from foreign sources. The case of DDT and falcons and the example of declines of POPs in seabird eggs demonstrate that effective domestic and international actions to restrict and eliminate POPs can reverse and lower significant environmental and health threats over the long term. Continued domestic actions, as outlined in this document, are important to further reduce levels of POPs in Canada and to address emerging chemical issues. At the same time, effective implementation by all Parties to the Stockholm Convention is of vital interest to Canada because it will reduce Canada's exposure to foreign sources of POPs that are adversely impacting the health and environment of Canadians, especially Aboriginal northerners and their children.

Thick-billed Murre

© Garry Donaldson

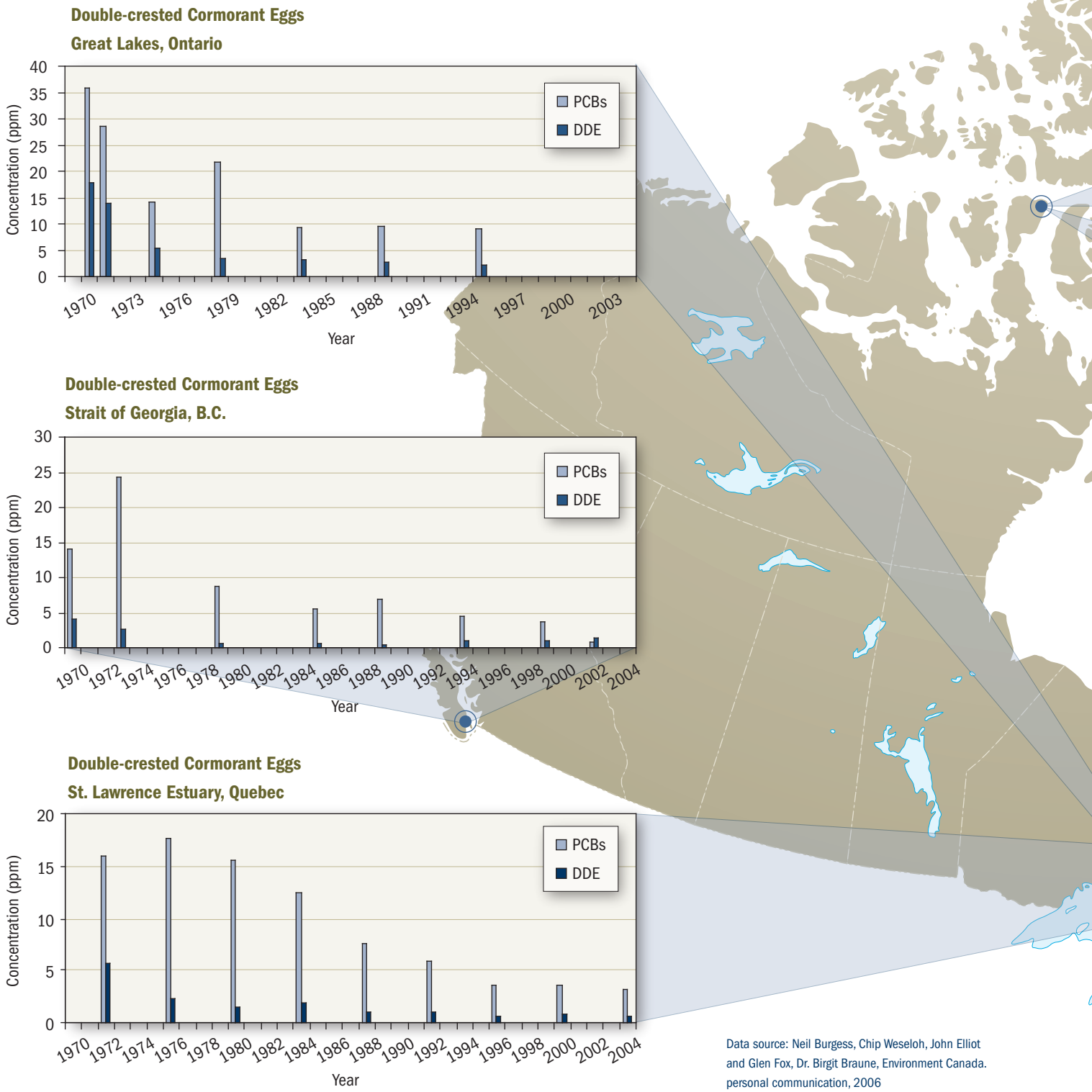
1.3.5 Canada's leadership on POPs

Canada has been actively involved with growing global efforts to reduce and eliminate POPs, beginning with early research on the effects of POPs in the Great Lakes and the Arctic.

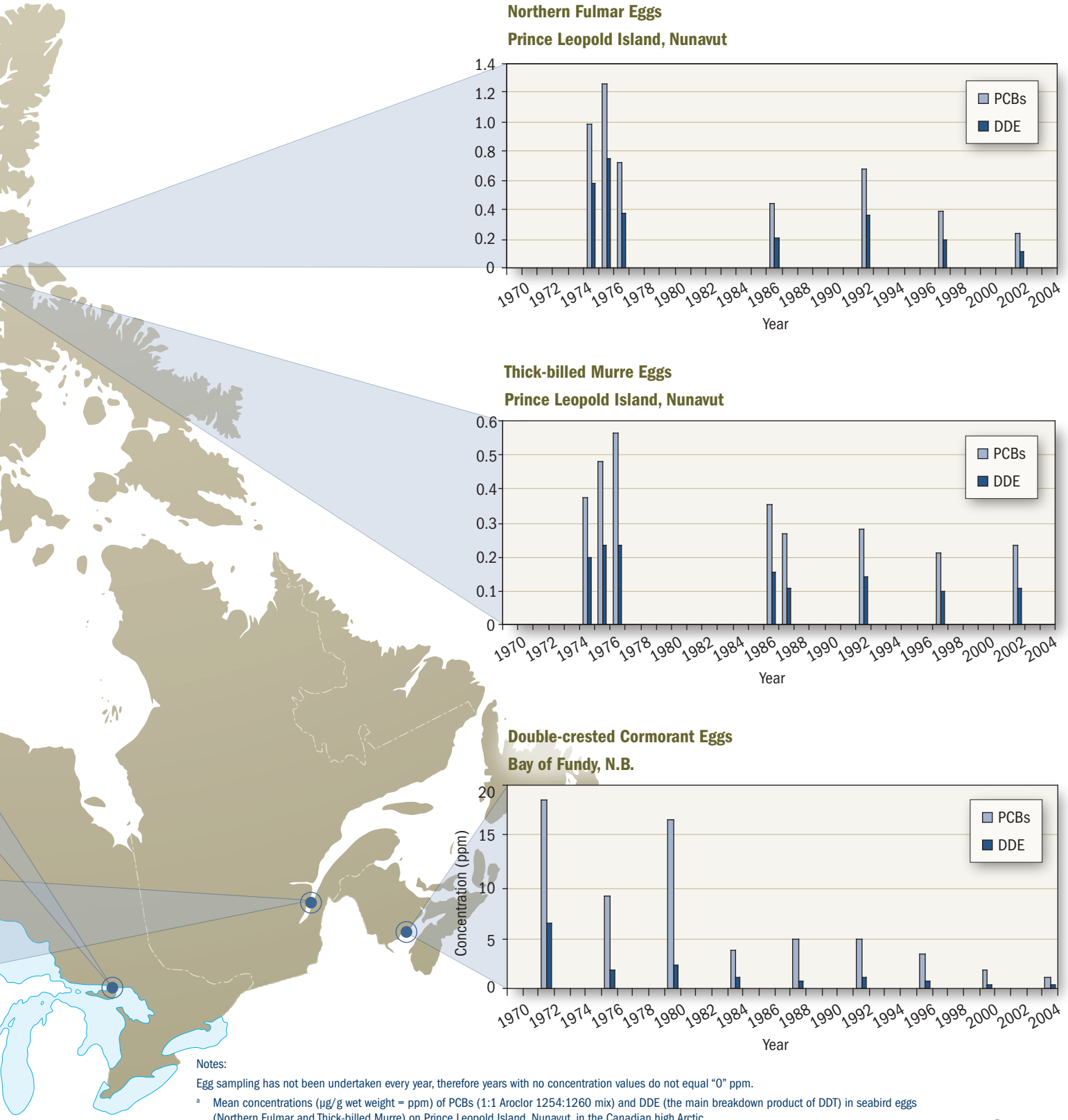
In the early 1970s, Canadian and American scientists conducting research under the Great Lakes Water Quality Agreement detected the presence of many toxic chemicals in the Great Lakes, including substances that had been banned in the area. The discovery of PCBs and the pesticide toxaphene in remote parts of Lake Superior was one of the first indications of the significance of atmospheric transport in the Great Lakes region. Further scientific investigation on the atmospheric pathways of POPs into the Great Lakes provided the basis for strategies to protect these waters.

[24] Environment Canada, 2003. State of the Environment InfoBase, *Toxic Substances*, Environmental Signals: National Indicator Series 2003. www.ec.gc.ca/soer-ree/English/Indicator_series/new_issues.cfm?issue_id=2&tech_id=6#bio_pic

Figure 1-8: Concentrations of PCBs and DDE in seabird eggs across northern[a] and southern[b] Canada, trends from 1970 to 2004



Data source: Neil Burgess, Chip Weseloh, John Elliot and Glen Fox, Dr. Birgit Braune, Environment Canada. personal communication, 2006



Notes:

Egg sampling has not been undertaken every year, therefore years with no concentration values do not equal "0" ppm.

[a] Mean concentrations (µg/g wet weight = ppm) of PCBs (1:1 Aroclor 1254:1260 mix) and DDE (the main breakdown product of DDT) in seabird eggs (Northern Fulmar and Thick-billed Murre) on Prince Leopold Island, Nunavut, in the Canadian high Arctic.

[b] Mean concentrations (µg/g wet weight = ppm) of DDE & PCBs (1:1 Aroclor 1254:1260 mix) in Double-crested Cormorant eggs at four sites: Strait of Georgia – Mandarte Island, B.C.; Great Lakes – North Channel, Lake Huron, Ontario; St. Lawrence Estuary – Ile aux Pommes, Quebec; Bay of Fundy – Manawagonish Island, N.B.

In the late 1980s, Canadian scientists discovered that the air, water, plants, animals and people living in Canada's North were exposed to POP contaminants, and at levels high enough to be of concern. Further, local pollution sources could not account for the levels of POPs being found. Canadian scientists conducted much of the original research that resulted in the "grasshopper effect" model, showing how POPs can be transported through the atmosphere over long distances towards colder regions.

Seabird colony on Coburg Island, between Ellesmere and Devon Islands in Canada's high Arctic

© Garry Donaldson

The federal Northern Contaminants Program, established in 1991, has improved its effectiveness by working cooperatively and respectfully with northern Aboriginal communities to ensure that scientific information is shared and communicated in a manner that benefits those most affected by POPs contamination.

Canada is also a world leader on developing and implementing domestic policies, legal instruments and technologies to deal with POPs and other toxic substances.

In 1990, dioxins and furans were declared toxic under the *Canadian Environmental Protection Act*. Two years later, regulations were developed for these substances in liquid effluent discharged from pulp and paper mills. As a result of implementing the Pulp and Paper Regulations and complementary provincial regulatory initiatives, industry was encouraged to switch to an elemental chlorine-free bleaching technology, and releases of dioxins/furans to the aquatic environment were reduced by more than 99% by 1997.

In 1995, the federal government adopted the leading-edge Toxic Substances Management Policy (TSMP). A key element of the TSMP is the requirement of "virtual elimination" of releases of the most dangerous toxic substances (those that meet specific criteria for persistence and bioaccumulation and that result primarily from a human activity, such as POPs) to the environment.

The Canadian Environmental Protection Act, 1999 (CEPA 1999) also included provisions for virtual elimination, putting Canada on the leading edge of environmental protection law worldwide.

CEPA 1999 also imposed tough deadlines, requiring categorization of the 23 000 substances in commerce to be completed by September 2006. As a result, Canada is the first country to systematically review all its substances in commerce to determine which are persistent, bioaccumulative or inherently toxic, or which represent the greatest potential for exposure to individual Canadians. Further, the categorization exercise will provide the information base needed to assist Canada, and other

INC Chair John Bucinni receives applause at successful conclusion of negotiations of the Convention in December 2000

Photo courtesy of IISD/Earth Negotiations Bulletin

Canada's negotiating team for the Stockholm Convention on POP received the Canadian government's Head of the Public Service Award in 2001

Photo courtesy of: The Leadership Network - Public Service Human Resources Management Agency of Canada
Notes:
Team members, representing seven government departments (left to right): David Stone, Alan Nymark,* Greg Filyk, Richard Ballhorn, Yves Le Bouthillier, Anne Daniel, Steve Hart, Caroline Caza, Garth Bangay,** Mel Cappe,*** Andrew Gilman, Suzanne Fortin, Ken Macartney, Nancy Johns, Torsten Ström, Heather H. Amys, Robert Matheson, Bernard Madé, Jean-Louis Wallace, John Buccini. Other team members, not pictured: Nigel Bankes, Terry Bidleman, Nelson Guillemette, Robie Macdonald, Hans Martin, James McCuaig, Derek Muir, William Murray, Ross Norstrom, Charles Parker, William Strachan.
Pictured with the team:
* Deputy Minister, Environment Canada;
** Individual recipient of a Head of the Public Service Award;
*** Clerk of the Privy Council.

interested Parties, in identifying candidate POPs and supporting and/or reviewing nominations to the Stockholm Convention.

In recent years, federal and provincial/territorial governments have developed Canada-wide Standards (CWS) for Dioxins and Furans. These standards set emission limits that are among the most stringent in the world for key domestic source sectors (such as incinerators, steel-making electric arc furnaces, iron sintering plants) and have comprehensive requirements, including pollution prevention strategies.

In the international arena, Canadian research was significant to global understanding of the problems caused by POPs and why international action was the only way to solve those problems.

Canada's efforts towards the creation of a global treaty included active support of UNEP's 1995 Governing Council decision inviting the Inter-Organization Programme on the Sound Management of Chemicals (IOMC) to work with the Intergovernmental Forum on Chemical Safety (IFCS) and the International Programme on Chemical Safety (IPCS) to assess an initial short-list of substances believed to be POPs and, based on the results, develop recommendations for international action. When the Council directed UNEP to convene an Intergovernmental Negotiating Committee (INC) with the mandate to develop an international legally binding instrument, Canada stepped forward and funded the first session of the INC, hosted in Montreal in 1998. A Canadian, Dr. John Buccini, was selected to chair the INC and to lead the negotiations of the Convention. As mentioned previously, Canada was the first country to sign and ratify the new agreement in May 2001.

Canada was the first country to commit financial assistance specific to the aims of the Convention, to aid developing countries and those with economies in transition to build their capacity to deal with POPs. The Government of Canada created the $20 million Canada POPs Fund in March 2000. A significant portion of these funds has been used for education and awareness projects among developing countries and countries with economies in transition and for inventory building, thus assisting national governments with their decisions to sign and ratify the Convention.

Canada participated at all INC meetings leading to agreement on the Convention, operating in a unique manner. Traditionally, delegations to international negotiations include government officials only. As is the case with negotiations on other international agreements, Canada's delegation to the Stockholm Convention's INC meetings included federal government officials as well as representatives from provincial/territorial governments, northern Aboriginal communities, environmental non-governmental organizations (NGOs) and industry. Canada was the only country to include non-governmental representatives in its delegation, and their contributions to final negotiations around issues such as exemptions for DDT use were significant.

In view of the threats posed by POPs to Canada's environment and health, conclusion of the Stockholm Convention on POPs is considered a major achievement for Canadian environmental foreign policy. In 2001, the Canadian government presented its Head of the Public Service Award (recognizing Canadian public servants who have performed at the highest level) to the negotiating team for the Stockholm Convention on POPs, for the leading role Canada played throughout the development of the Convention and the original scientific work demonstrating the global nature of the problem. An individual Head of the Public Service Award was also presented to Garth Bangay for his early and successful efforts over many years linking science, policy and partnerships with northern Aboriginal communities to find solutions to the POPs problem.

With the entry into force of the Convention, Canada maintains active involvement in Convention committees and working groups, including, but not limited to, those on financial mechanisms, legal issues, compliance, effectiveness evaluation, global monitoring, BAT and BEP, environmentally sound management of wastes and technical review of candidate substances for international action.

Alexandra Falls, Northwest Territories

Photo by: T. Parker / © Northwest Territories Tourism

2. CANADA AND POPs

Bald Eagle

© Corel Corporation

2.1 Canada

2.1.1 Geography

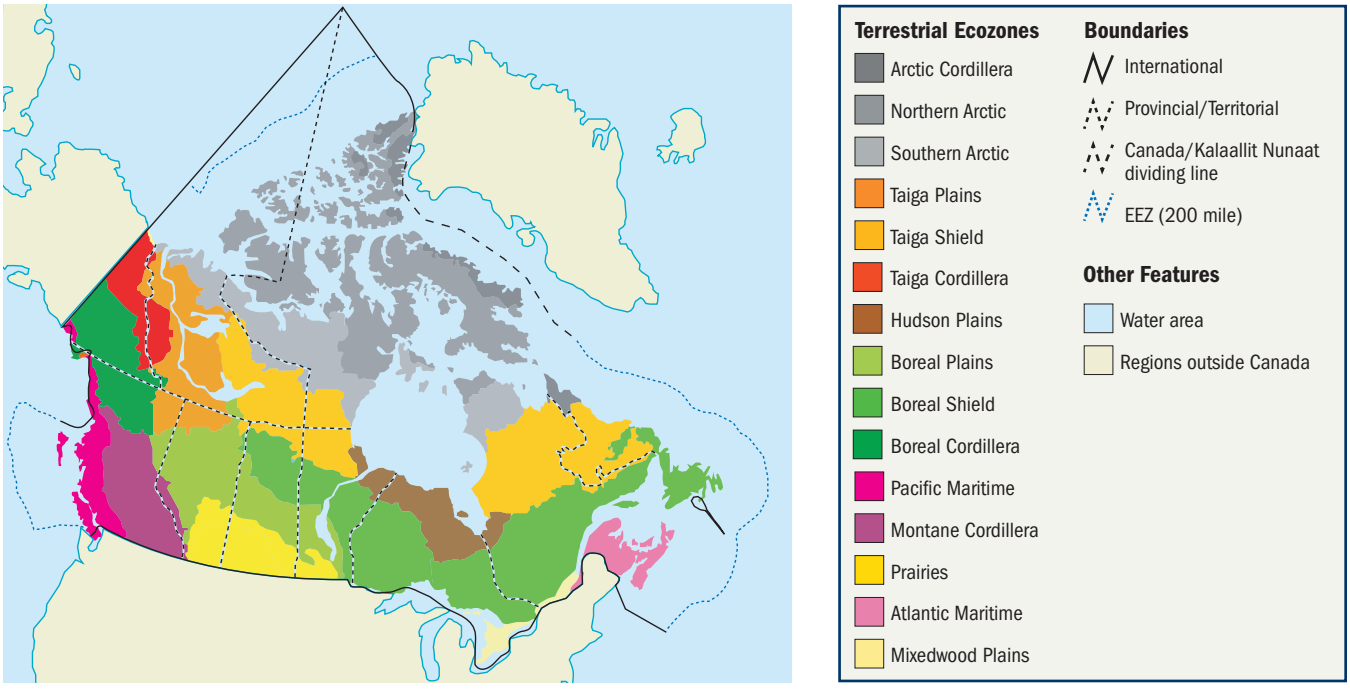
Canada is the world's second largest country, covering half a continent and intersected by six time zones, with a total area of almost 10 million square kilometres. Surrounded by the Arctic, Atlantic and Pacific oceans and sharing the Great Lakes with the United States, Canada has 25% of the world's coastline (244 000 km) and the world's largest freshwater system, with two million lakes and rivers accounting for 7.6% of Canada's area.

The geography of Canada can be divided into 20 ecozones. Fifteen ecozones make up terrestrial Canada (Figure 2-1) and five make up the marine waters bordering Canada. For simplicity, the terrestrial ecozones can be combined into seven distinct Canadian regions, each with a very different landscape and climate.[25]

> An ecozone is an area of the earth's surface that represents a large ecological zone and has characteristic landforms and climate. Each ecozone is distinguished from others by its unique mosaic of plants, wildlife, climate, landfrms and human activities.

To the west is the Pacific coast (Pacific Maritime ecozone), with a mountainous coastline indented by deep fiords and glacial valleys and bordered by plains along the ocean. Warm, moist Pacific air currents provide a moderate climate of relatively dry summers and mild, wet winters.

Figure 2-1: Terrestrial ecozones of Canada



Source: Natural Resources Canada, The Atlas of Canada. atlas.gc.ca/site/english/maps/environment/ecology/framework/terrestrialecozones

[25] Government of Canada. http://canadainternational.gc.ca/intro/Geography_and_Climate-en.aspx

Pacific Coast - Howe Sound, British Columbia

The Cordillera (Montane Cordillera, Boreal Cordillera and Taiga Cordillera ecozones) is the mountainous region of western Canada, which includes most of British Columbia, the Yukon, and southwest Alberta. Long chains of high, rugged mountains stretch from north to south including the Rocky Mountains on the east side and the Coastal Mountains near the Pacific Ocean. The area has long, cold winters and short, warm summers, with heavy amounts of precipitation in the higher altitudes and much less in the valleys between the mountains.

Cordillera - Trail Riding near Canmore, Banff National Park, Alberta

In the middle of Canada are the Prairies (Prairies ecozone). The Prairie provinces of Alberta, Saskatchewan and Manitoba are among the richest grain-producing regions in the world. Cold winters and moderate to hot summers are the norm, with relatively light precipitation.

Prairies - Saskatchewan countryside

Canada's largest geographical feature, covering over half of Canada, is the Canadian Shield (Boreal Shield, Taiga Shield, Boreal Plains, Taiga Plains and Hudson Plains ecozones). A rocky region with little soil, the Canadian Shield extends to Hudson Bay, covered by forests, wetlands and lakes. The Hudson Plains are the most extensive area of wetlands in Canada. The Canadian Shield is the country's primary source of minerals, including gold, silver, zinc, copper and uranium. The climate varies across this vast region, with generally cold winters and warm summers and moderate precipitation.

With good agricultural soils, gentle topography and a relatively warm summer climate, the Great Lakes–St. Lawrence Lowlands (Mixedwood Plains ecozone) is intensively used and highly populated. It is the country's industrial heartland and contains Canada's two largest cities, Montreal and Toronto. Fifty percent of Canadians live in this small region. While it is occasionally very cold in winter, the region has mild springs and hot, humid summers, with moderate precipitation.

Canadian Shield - Rocky Point, Saskatchewan

Photo: Miles Constable, 2005 / Environment Canada

Great Lakes-St. Lawrence Lowlands – St. Lawrence River, Ontario

© Corel Corporation, 1994

The Appalachian region encompasses Canada's Maritime provinces of New Brunswick, Nova Scotia and Prince Edward Island (Atlantic Maritime ecozone) and Newfoundland and Labrador (part of the Boreal Shield ecozone). Much of this area has low, rocky hills and plateaus as well as a deeply indented coastline. Because it is by the ocean, the Appalachian Region has a fairly mild climate. The summers are warm and the winters are not too cold compared with the rest of Canada. There is a lot of precipitation (rain and snow) in the region, averaging about 100 cm per year.

Appalachians – Grand Manan Island, the Bay of Fundy, New Brunswick

© Canadian Tourism Commission

The Arctic region is Canada's far North (Southern Arctic, Northern Arctic and Arctic Cordillera ecozones). It is also known as the Tundra, where no trees grow because it is too cold and dry. In fact, except for the top layer of soil, the ground is frozen all year round, called permafrost. This area is often called the "land of the midnight sun" because in summer, around June 21, the sun never goes down. In winter, around December 21, the sun never rises. Winters can be long, dark and extremely cold, with temperatures rising above freezing only a few weeks a year. During the short summer, however, the temperature can reach 30°C.

Arctic region - The first sun of the new year Feb 2003. Clyde River, Nunavut

© Eric Loring, 2003

2.1.2 Population

Canada's population is approximately 31.6 million. Of this total, just under one million people (3.3% of the total population in 2001) identify themselves as Aboriginal (62% North American Indian, 30% Métis and 5% Inuit).

Over the past century, there has been a significant population shift away from rural areas (for example, in 1931, 1 in 3 Canadians lived on farms, compared with approximately 1 in 40 in 2001). A large majority (80%) of Canada's population is urban, with 40% of it concentrated in five major urban centres: Toronto, Montreal, Vancouver, Ottawa (the national capital) and the Calgary/Edmonton corridor. About 90% of Canada's population is located within 160 km of the U.S. border. In contrast, the three territories of Canada's North (Yukon, the Northwest Territories and Nunavut) have 41% of Canada's land mass, but only 0.3% of the population.

In 2001, Canada's birth rate was 10.5 per 1000 people, similar to the levels of Switzerland, Finland and Belgium. During the same year, the death rate was 7.1 per 1000 people. The life expectancy of Canadians has increased significantly in recent decades, from 66 years to 77 years for boys born in 1951 and 2001, respectively, and from 71 years to 82 years for girls born in those same years, respectively. Canada's general increase in life expectancy, together with falling birth rates, has considerably increased the proportion of elderly people.

Calgary, Alberta

© Canadian Tourism Commission

Montreal, Quebec

© Canadian Tourism Commission

Immigration has always been an important factor in Canada's growth. Canada welcomed more than 13.4 million immigrants during the past century. In 2001–2002, Canada's population increase from immigration was almost twice as much as from natural growth: 96 000 more Canadians were born than died, and 185 000 more people moved to Canada than left.

Immigration trends are also creating a more diverse and multicultural country. Prior to 1961, most immigrants to Canada were from northern and western Europe and the United Kingdom. Those who came during the 1960s were most likely to have come from southern Europe. During the 1970s, the proportion of Europeans declined; in contrast, the proportion of immigrants from east and southeast Asia increased, and they began to dominate immigration patterns by the 1980s. Of the 1.8 million immigrants who arrived between 1991 and 2001, 58% came from Asia, including the Middle East; 20% from Europe; 11% from the Caribbean, Central America and South America; 8% from Africa; and 3% from the United States.[26]

[26] Statistics Canada, *Canada e-Book* (the web-based version of the Canada Year Book, 2003), with updates. http://142.206.72.67/r000_e.htm

Canada's diverse range of ethnic origins - Multicultural Celebration, Saskatchewan

2.1.3 Political profile

Canada is a constitutional monarchy with a federal system, a parliamentary government and strong democratic traditions. Canada's Parliament consists of three parts: the Queen (the Head of State), represented by the Governor General; the appointed Senate; and the elected House of Commons.[27] The Upper House of the Canadian Parliament is the Senate, which consists ordinarily of 105 Senators, appointed by the Governor General on the advice of the Prime Minister to represent regions, provinces or territories. Legislative power rests with the 308-member House of Commons, which is elected for a period not to exceed five years. The Prime Minister is the leader of the political party in power and is the head of the cabinet. The cabinet remains in office as long as it retains majority support in the House of Commons on major issues.

Canada is divided into 10 provinces and 3 territories. The map of Canada in Figure 2-2 depicts political boundaries and identifies the national and provincial/territorial capitals. Each province is governed by a premier and a single, elected legislative chamber.

The Constitution authorizes the federal Parliament "to make laws for the peace, order and good government of Canada," except for "subjects assigned exclusively to the legislatures of the provinces." The federal government has power over areas such as criminal law, defence, international trade and broadcasting. The provincial legislatures have powers over many areas, including natural resources, hospitals, municipal institutions, property and civil rights in the province, and education. Constitutionally protected land claim and self-government agreements completed with some First Nations and Inuit recognize the inherent right of Aboriginal peoples to govern their own affairs. Not explicitly mentioned in the Constitution, the environment has emerged as an area of shared jurisdiction among the federal, provincial, territorial and Aboriginal governments.[28]

Parliament Hill, Ottawa, Ontario

[27] Parliament of Canada. www.parl.gc.ca/common/index.asp?Language=E

[28] Government of Canada, *Sustainable Development: A Canadian Perspective*, 2002.

Figure 2-2: Political map of Canada

2.1.4 *Economic profile*

Gross domestic product (GDP) is the value of all goods and services produced in a national economy.

In 2002, Canada ranked sixth in the world in gross domestic product (GDP) per capita. In 2002, the Canadian economy posted the strongest GDP growth of all G7 countries. GDP grew at a rate of 3.3% for the year, reaching $1.17 trillion in 2004.

Unless otherwise indicated, monetary values are in Canadian dollars ($CAD). In May 2006, $CAD 1.00 = $US 0.90 = Euro 0.70 = UK Pound 0.47. 1.17 trillion = 1 170 000 000 000.

Canada's economic well-being is tied to many factors: natural resources; manufacturing and construction industries; financial and service sectors; communications and transportation technologies; trade relationships with other nations; and the ability to compete in a global marketplace.

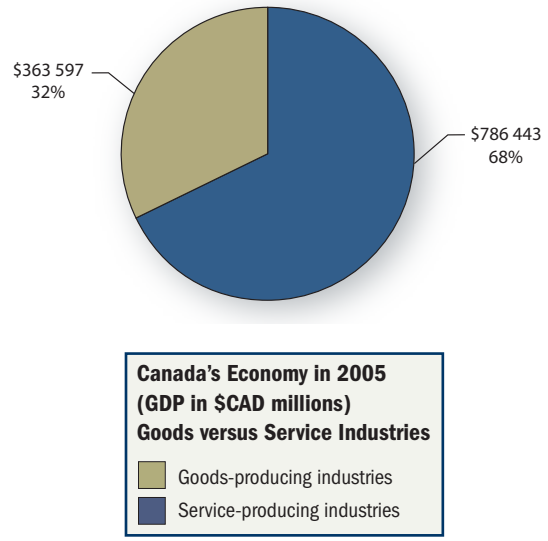
Trade is the lifeblood of the Canadian economy, with exports accounting for more than 40% of the GDP, making Canada one of the most open economies in the world. Canada's leading exports are automobile vehicles and parts, machinery and equipment, high-technology products, oil, natural gas, metals and forest and farm products. Canada's main imports are machinery and equipment, motor vehicles and parts, crude oil, chemicals, electricity and durable consumer goods. In 2004, Canada enjoyed a positive balance of trade of about $65 billion. Canada and the United States have the largest and most comprehensive trading relationship in the world. More than 80% of all Canadian exports go

to the United States, while nearly a quarter of U.S. exports come to Canada. Canada's exports to the United States and Mexico rose by 110% between 1993 and 2000, driven by the North American Free Trade Agreement (NAFTA).

Canada is evolving into a service- and knowledge-based economy. Services now constitute the single largest sector, with 68% of total GDP (Figure 2-3) and 75% of employment.

> Statistics Canada categorizes service-producing industries as: transportation and warehousing; information and cultural industries; wholesale trade; retail trade; finance and insurance, real estate and renting and leasing and management of companies and enterprises; professional, scientific and technical services; administrative and support; waste management and remediation services; public administration; educational services; health care and social assistance; arts, entertainment and recreation; accommodation and food services; and other services.

Figure 2-3: Canada's gross domestic product in 2005: Goods-versus service-producing industries.



Data source: Statistics Canada, Gross domestic product at basic prices by industry (adapted for current prices). www40.statcan.ca/l01/cst01/econ41.htm

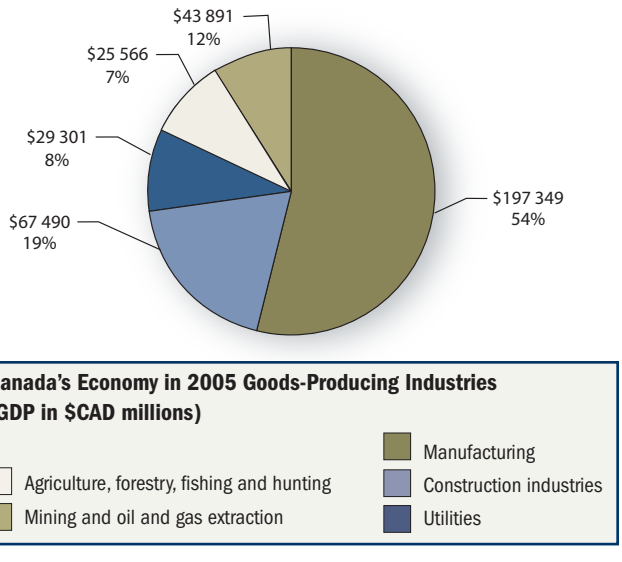
The remaining 32% of the economy, based on GDP, is the goods-producing industries: agriculture, forestry, fishing and hunting; mining and oil and gas extraction; manufacturing; construction industries; and utilities (Figure 2-4).

2.1.5 *Profiles of economic sectors*

Intentionally made POP industrial chemicals and pesticides are goods that are produced and used. Releases of unintentional by-products may result from the production of some goods. The technologies and systems to control POP releases and alternative processes to avoid creating them may be goods and/or services. As detailed in this NIP, Canada does not produce, use, market or trade any of the intentionally produced chemicals listed in the Stockholm Convention (except for the allowable use of existing PCBs in service), but must deal with releases of UPOPs from specific industry sectors, as well as other sources.

This profile focuses on Canada's goods-based industries, in particular primary industries and a few secondary industry sectors with the potential to produce or use POPs; renewable resource-based industries (such as agricultural goods and fisheries) that are potentially impacted by POPs contamination; environmental

Figure 2-4: Canada's gross domestic product in 2005: Goods-producing industries sector



Data source: Statistics Canada, Gross domestic product at basic prices by industry (adapted for current prices). www40.statcan.ca/l01/cst01/econ41.htm

industries that, in some applications, deal with controlling toxic chemicals such as POPs; and traditional economies of Aboriginal peoples, which depend on the health of the land and its natural resources.

There are significant regional differences in Canada's goods-based economy: resource-extractive industries are relatively more important in the east, west and north; agriculture plays an important role in the three Prairie provinces; and manufacturing fuels Ontario's and Quebec's economy.

For centuries, Canada's primary industries — agriculture, fishing and trapping, mining, fuel and energy, and logging and forestry — were the foundation of the economy. Their relative importance has declined as Canada's economy has diversified. However, the primary industries of rural Canada still contribute significantly to the economy, generating 15% of GDP and 40% of Canadian exports.[29] Recent increases in global demand for raw materials and energy are leading to resurgent growth in these industries. Primary industries also provide the foundations and resources for Canada's secondary manufacturing and service industries. In addition, the contributions of primary industries are not merely economic; they also help to sustain communities in Canada's rural areas and hinterlands.

Farming is practised on about 7% of Canada's land area, primarily in two main regions of the country: the Prairie grasslands ecozone of Alberta, Saskatchewan and Manitoba, and the Mixedwood Plains ecozone, stretching along the St. Lawrence River and into southern Ontario. Each of Canada's many agricultural regions suits a particular range of crops or livestock, such as fruits and vegetables in British Columbia; beef cattle in Alberta; wheat and canola in Saskatchewan and Manitoba, mixed farming and dairy cattle in Ontario and Quebec; and potato farming in Prince Edward Island. Canada is the fourth largest exporter of agricultural and food products, each year exporting products valued at $24 billion to about 180 countries.

Grain harvesting on the Praries

Commercial fishing has been a mainstay of coastal communities for centuries. While still important, stocks of traditional species of fish have been reduced dramatically in the Atlantic (particularly groundfish living on or near the ocean floor, such as cod, halibut and sole) and Pacific (salmon) fisheries in recent decades. The situation became so acute in 1992 that the federal government imposed moratoria on many of the Atlantic fisheries to allow stocks time to recover.[30] The shellfish fishery (lobster, shrimp, mussels and clams) has risen in importance, and aquaculture is emerging as a potential long-term complement to the declining fisheries industries. Despite these concerns, Canada is the sixth largest fish and seafood exporter. In 2002, 75% of fish and seafood products were exported to 80 countries, valued at $4.7 billion. Fishing is also a popular recreational activity, with more than 3.6 million adults fishing in 2000.[31]

The mining, petrochemical and pulp and paper industries are of importance to the Canadian economy. Combined, there are over 1200 industrial sites representing approximately 10% of Canada's GDP and directly employing more than one million people.[32] Canada is one of the world's largest exporters of minerals and mineral products, which provided 12% of Canada's total exports in 2002.

[29] Standing Senate Committee on Agriculture and Forestry, *Interim Report: Canadian Farmers at Risk*, June 2002.

[30] Statistics Canada, *Canada e-Book* (the web-based version of the Canada Year Book, 2003), with updates. http://142.206.72.67/03/03b/03b_003_e.htm

[31] Fisheries and Oceans Canada. www.dfo-mpo.gc.ca/communic/facts-info/facts-info_e.htm

[32] Culp, J.M., Ciborowski, J., Dubé, M.G., Liber, K., Munkittrick, K.R. and Parker, W.R., *Industrial Point Source Discharges*, National Water Research Institute, Environment Canada, 2003. www.nwri.ca/threatsfull/ch10-1-e.html

There are approximately 900 mining sites across Canada where base metals, gold, potash, coal and iron ore have been or are being extracted. Although many of these sites are currently closed or abandoned, the number of operating mines in Canada ranges between 100 and 170.

Fishing boats heading out to sea, Atlantic Coast

Despite a relatively small population, as a highly industrialized nation in a cold, northern climate, Canada is one of the largest consumers of energy in the world. The petrochemical industry can largely be broken down into three categories: extraction, refining and transportation. These activities contribute $30 billion to the Canadian GDP (4%) and employ approximately 400 000 people at over 200 locations across the country. In 2001, Canada was the third largest producer of natural gas (9.4% of world output) and the 14th largest producer of petroleum (2.6%). In 2002, oil and gas accounted for 77% of Canada's energy production and added $23 billion (1997 constant dollars) to the Canadian economy. Alberta alone was responsible for 74% of this total. Since Canada produces more crude oil and natural gas than it consumes, roughly 60% is exported. The greatest promise for Canada's oil industry lies in the oil sands of northern Alberta, potentially one of the single greatest energy resources on earth. Mining and extraction in the oilsands retrieve about 858 000 barrels per day (2003), equal to approximately 34% of Canada's total oil production (2.5 million barrels per day). The Arctic and the East Coast offshore basins are the most recent areas of petroleum exploration and production.

Petroleum refinery, Sarnia, Ontario

The energy needs of Canadians are also met by the generation of electricity through coal, uranium and water power. In 2002, approximately 60% of Canadian electricity was provided by hydroelectric power. The remaining third of Canada's electricity is provided by coal for thermal power and uranium for nuclear energy.

After the Russian Federation, Canada has the largest continuous forested area on earth, covering nearly half the nation's land mass and constituting 10% of the globe's forest cover. The Canadian forest products manufacturing sector comprises the paper and allied products as well as the wood and building products industries. It is the largest and most geographically dispersed

Alberta oil sands

Photo by: Mike Norton © Environment Canada, 2004

industrial employer in Canada. There are about 125 pulp and paper mills and 350 forest-dependent communities. Forests contribute approximately $27 billion to Canada's annual GDP and provide 1 out of every 44 Canadian jobs. Forest products account for 9% of all Canadian exports (valued at $50 billion in 2000), and Canada is the world's largest exporter of wood pulp, paper, sawn wood and wood-based panels.

Manufacturing and construction industries accounted for about 22% of Canada's GDP in 2002. The chemical industry is part of manufacturing, consisting of four main components in Canada: adhesives and sealants; paints and coatings; petrochemicals; and synthetic resin. In 2003, imports of chemical products totalled $33.2 billion and industry exports were $20.3 billion. Exports of chemicals represent 5.3% of total exports of manufactured goods, and this proportion has increased in the past five years. Trade with the United States predominates, receiving 83% of Canadian exports and the source for 69% of imports in 2003. There are over 2000 chemical industry establishments employing 91 000 people in Canada, concentrated in Quebec, Ontario, Alberta and British Columbia.[33]

The Canadian pesticide industry focuses on products for the agricultural and forestry industries. The manufacture of pesticides can be divided into two categories: the production of active ingredients; and the consolidation of these active ingredients into formulas for a specific use. In Canada, the industry's manufacturing firms are subsidiaries of global firms, and parent companies supply Canadian subsidiaries with active ingredients (which are then mixed with other chemicals to create formulas) or formulated products. Other major suppliers to the Canadian market act as distributors only and do not manufacture pesticides in Canada. Canadian manufacturing tends to specialize in a limited range of processes and products and exports about 44% of production to world markets.[34] Canadian sales represent 3% of the total global crop protection market. In 2004, Canadian domestic sales of pest control products were about $1.33 billion. Herbicides accounted for 77% of all pesticide sales, fungicides 10%, insecticides 6% and specialty products 8%.[35]

Loading pulp wood in Caribou, Nova Scotia

The majority of Canada's 15 iron and steel facilities are found in Ontario and Quebec. Three other iron and steel facilities are located in Alberta, Saskatchewan and Manitoba. Integrated steel plants produce steel from mostly virgin raw materials, while non-integrated plants produce steel primarily from steel scrap. There are four integrated steel plants (all located in Ontario) and 10 non-integrated plants operating electric arc furnaces. Canada has one iron sintering plan, located in Ontario. All but one of Canada's aluminium refineries are found in Quebec; the other is in British Columbia.[36]

The Canadian base metals smelting and refining sector produces cobalt, copper, lead, nickel and zinc, as well as various co-product metals, such as gold, silver, indium, germanium, cadmium, bismuth and selenium. Primary processing generally produces metals from ore concentrates, while secondary processing produces metals from recyclable materials, which include post-consumer electronic components, metal parts, bars, turnings, sheets and scrap wire.

[33] G. McGee, Industry Canada, personal communication, 2005.

[34] International Trade Canada, *Canadian Agricultural Chemical Industry Pesticides: Herbicides, Insecticides, Fungicides*, April 2003. www.infoexport.gc.ca/iei/ieiSmartViewer.jsp?did=8431&sitid=138

[35] Croplife Canada, *2004/5 Annual Report*. www.croplife.ca/english/pdf/annualreport/04-05_croplife_annual_report_en.pdf

[36] Natural Resources Canada, *The Atlas of Canada: Metal Mining*. http://atlas.gc.ca/site/english/maps/economic/mining/metal_mines/1

The largest base metal facilities in Canada involve the production of nickel, copper, zinc and lead. The large size and cost of constructing and operating these facilities encourage economies of scale, so a plant usually processes the concentrates produced by several mines. The largest base metal processing facilities are found in Trail, British Columbia; Flin Flon and Thompson, Manitoba; Sudbury and Timmins, Ontario; Rouyn-Noranda, Quebec; and Belledune, New Brunswick.

Investment in environmental protection and conservation initiatives also plays a significant economic role. For example, in 2000, the logging, mining, oil and gas extraction, pulp, paper and paperboard mills and primary metal industries spent $2.6 billion on activities such as land reclamation, habitat protection and pollution prevention, abatement and control practices. To maintain the productivity of agricultural and forested land and other ecological benefits, Canadian farmers and forestry managers employ a number of land management and conservation techniques. The government works with industries in sustainability and recovery efforts, such as stemming the decline in Canada's fish stocks.[37]

The environment industry is an evolving industrial sector that provides goods (such as environmental technologies and equipment) and services (such as consulting or waste management systems) that are used to measure, prevent, limit or correct environmental damage (both natural or by human activity) to water, air and soil, as well as problems related to waste, noise and ecosystems. They also include clean or resource-efficient (eco-efficient) technologies that decrease material inputs, reduce energy consumption, recover valuable by-products, reduce emissions and/or minimize waste disposal problems. Important subsectors of the industry include environmental consulting and engineering, waste management, water supply and purification and wastewater treatment. Canada's environment industry is made up primarily of small businesses (over 90% have 50 employees or less), numbering over 10 500 firms and public establishments in 2000. The total Canadian environmental business market was valued at $30 billion in 2001, representing roughly 2.2% of Canadian GDP.[38] Exports exceeded $1.6 billion and were estimated to have grown by as much as 20% in 1999 and 2000.[39]

The traditional economies of Aboriginal societies continue to play an essential role in the well-being of the lives of Aboriginal peoples, albeit to a lesser extent than they once did. Traditional economy describes the economic activities, services and goods that constitute the basis of Aboriginal culture (and is often not included in national accounts, such as GDP).

Two significant components of the traditional economy are traditional food systems and trade and manufacture of traditional goods. Traditional food systems (also often referred to as sustenance, subsistence, country food and customary harvesting) include the harvest of biological resources — fish, wildlife, plants and berries — for local wants and needs.

Trade and manufacture of traditional goods (such as moccasins) include small-scale and local trade in goods and services, usually among Aboriginal peoples. They also operate at the interface with the broader Canadian society, to create a mixed economy of both wage-earning and traditional practices. Arts and crafts, translation services, guiding and a host of other services provided by local peoples have slowly entered the mainstream economy.[40]

Woman selling traditional handicrafts

© Government of Yukon

[37] Statistics Canada, *Canada e-Book* (the web-based version of the Canada Year Book, 2003), with updates. http://142.206.72.67/03/03b/03b_007_e.htm

[38] Industry Canada, http://strategis.ic.gc.ca/epic/internet/inea-ae.nsf/en/Home

[39] Government of Canada, *Innovation in Canada: The Canadian Environment Industry*. www.innovationstrategy.gc.ca/gol/innovation/site.nsf/en/in02574.html

[40] C. Paci, Manager, Lands and Environment, Dene Nation; Advisor, Arctic Athabaskan Council Canada; personal communication, March 2005.

2.2 Canada and the environment

2.2.1 Environmental overview

Because of the great diversity in climates, landforms, vegetation, resources and economic activities, environmental stresses vary considerably across the country. In the boreal zones, some of the main concerns include ensuring sustainable use of forests and non-polluting mining operations. In agricultural and urban-based regions such as the Prairies, the Great Lakes and St. Lawrence Valley and parts of the west coast, concerns include drinking water quality, urban congestion, air pollution and loss of both wildlife habitat and farmland. On the Atlantic and Pacific coasts, declining fish stocks and concerns regarding forestry practices and land-based pollution are also significant. In the Arctic, prime concerns are managing the impacts of resource development on a fragile ecosystem and reducing the contamination of traditional food sources by toxic substances emitted from distant sources. The effects of climate change are also increasingly being felt in Canada's North and elsewhere.

2.2.2 General legislative framework

The shared nature of environmental jurisdiction in Canada makes close cooperation among the federal, provincial, territorial and Aboriginal governments vital to the success of national environmental policies and objectives. In order to develop national policies and standards to address issues of common concern such as air quality and toxics management, a number of coordinating councils have been created in a variety of policy fields, such as environment, energy, forestry and protected areas.

2.2.3 Roles and responsibilities of federal government, provinces, territories, municipalities and civil society

Environmental issues in Canada are managed at different levels of government, depending on jurisdiction and scope. Federal interdepartmental bodies, the federal/provincial/territorial Canadian Council of Ministers of the Environment (CCME)[41] and interjurisdictional working groups serve to coordinate the activities of government.

Initiated in 1998, under the CCME Harmonization Accord, Canada-wide Standards (CWS) represent commitments by Ministers to address environmental protection and health risk issues, including those posed by toxic chemicals.

Control of hazardous waste and hazardous recyclable material within Canada is subject to laws and regulations set in place by the federal, provincial and territorial governments. The federal government regulates international and inter-provincial/territorial movements. The provincial/territorial governments are responsible for the licensing of hazardous waste and hazardous recyclable material generators, carriers and treatment facilities, as well as for regulating intraprovincial movements. Under the Canadian Constitution, the federal government has the responsibility for all transboundary pollution issues, including those related to water and air.

2.2.4 International commitments, including regional and subregional agreements and organizations

As noted above, Canada's distribution of responsibility for environmental issues is complex. While the federal government conducts international treaty negotiations on behalf of Canada, the implementation of international agreements, depending on the subject matter, can be a shared responsibility among jurisdictions. The creation of consultative processes across all levels of government during both negotiation and implementation phases is necessary and beneficial to effective environmental management.

Canada is a party to many international environmental agreements, as summarized in Environment Canada's Compendium of International Environmental Agreements.[42] Because the Convention includes obligations related to hazardous wastes and their transboundary movements, it is closely linked with the Basel Convention on the Control of Transboundary Movements

[41] www.ccme.ca

[42] The database can be found at: www.ec.gc.ca/international/multilat/compendium_e.htm

of Hazardous Wastes and their Disposal[43] and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.[44]

Canada is a Party to both the Basel and Rotterdam conventions.

Of particular importance to this NIP are the following regional agreements:

- The Protocol on POPs, agreed to and adopted in 1998 pursuant to the 1979 United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (LRTAP), entered into force in October 2003. It focuses on a list of 16 substances that have been singled out according to agreed risk criteria. The substances comprise 11 pesticides, 2 industrial chemicals and 3 by-products/contaminants. The Protocol bans the production and use of some products outright (aldrin, chlordane, *chlordecone*, dieldrin, endrin, *hexabromobiphenyl*, mirex and toxaphene). Others are scheduled for elimination at a later stage (DDT, heptachlor, HCB, PCBs). Finally, the Protocol severely restricts the use of DDT, *hexachlorocyclohexane (HCH, including lindane)* and PCBs. The Protocol includes provisions for dealing with the wastes of products that will be banned. It also obliges Parties to reduce their emissions of dioxins, furans, *polycyclic aromatic hydrocarbons (PAHs)* and HCB.

  Note that substances in italicized text were not included in the Stockholm Convention at the point of entry into force of the Convention.

- The North American Agreement on Environmental Cooperation (NAAEC)[45] is the environmental side agreement to NAFTA. The Agreement was signed by Canada, Mexico and the United States and came into force on January 1, 1994. The Agreement creates a framework to better conserve, protect and enhance the North American environment through cooperation and effective enforcement of environmental laws. Specific North American Regional Action Plans (NARAPs)[46] related to POPs are being either developed or implemented by working groups organized by the Commission for Environmental Cooperation (CEC) under NAAEC: they include dioxins and furans, HCB, DDT, PCBs, chlordane and lindane.

- In 1997, Canada's Environment Minister and the Administrator of the U.S. Environmental Protection Agency (EPA) signed the Great Lakes Binational Toxics Strategy.[47] Under the strategy, Environment Canada and the U.S. EPA will work with provincial/state governments and other partners to virtually eliminate persistent toxic substances from the Great Lakes. Thirty-nine substances (including the 12 POPs identified under the Stockholm Convention) have been prioritized under the strategy by Canada and the United States for research, monitoring and action.

- The Arctic Council[48] was established in 1996 and is a high-level intergovernmental forum that provides a mechanism to address the common concerns and challenges faced by the Arctic governments and the people of the Arctic. One of the Council's programs relates to Arctic monitoring and assessment. The Arctic Monitoring and Assessment Programme (AMAP)[49] monitors and assesses the effects of pollutants on the Arctic environment and peoples of the Arctic, especially Indigenous peoples, reports on the state of the Arctic environment and gives scientific advice to ministers. AMAP research supports the Stockholm Convention and the UNECE Convention on LRTAP.

Canada has demonstrated a commitment to implementing programs that address global issues since its participation in the Earth Summit, held in Rio de Janeiro in 1992. The 2002 Earth Summit, sometimes known as Rio +10, took place in Johannesburg,

[43] www.basel.int

[44] www.pic.int

[45] www.cec.org/pubs_info_resources/law_treat_agree/naaec/index.cfm?varlan=english

[46] www.cec.org/programs_projects/pollutants_health/smoc/smoc-rap.cfm?varlan=english

[47] www.epa.gov/glnpo/bns

[48] www.arctic-council.org

[49] www.amap.no/

South Africa, and brought together people from around the world to focus global attention on actions to achieve sustainable development. Canada participated at the Summit, where it tabled a national report on its progress towards sustainable development over the past decade.[50] In the report, Canada concluded that its overall performance was consistent with that of most of its industrialized peers: its standard of living, its ecological footprint and the longevity and education of its citizens were all broadly comparable to those of the other G7 countries.

2.3 Key legislation and policies related to Canada's obligations under the Stockholm Convention

2.3.1 Key federal legislation and policies

2.3.1.1 The *Canadian Environmental Protection Act, 1999*[51]

The government's principal framework for protecting Canadians and the environment from harmful substances is the *Canadian Environmental Protection Act, 1999* (CEPA 1999). Under the authority of the Ministers of Environment and of Health, it is designed to ensure that potential risks from chemical substances, biotechnology products, industrial emissions, effluents and wastes are scientifically assessed and managed. It provides for strict controls of substances determined to be "toxic" and specifies time frames for developing and implementing preventive or control measures. It promotes cooperation/partnership with industry, environmental NGOs, Aboriginal peoples, educational institutions, municipalities, public health NGOs and provinces/territories.

CEPA 1999 includes broad authorities for the regulation of toxic substances and provides a safety net by addressing environmentally relevant aspects of substances that are not regulated under other federal statutes. Specific provisions of the Act provide a statutory process for identifying and managing toxic substances. Substances new to Canada are assessed before they are introduced into Canadian commerce. For substances already in use in Canada, there are several mechanisms under the Act to identify substances to be assessed to determine whether they are toxic. When a substance is found to be toxic under the Act, appropriate preventive or control measures are initiated to address the relevant sources. The objectives of these measures are consistent with the Toxic Substances Management Policy (TSMP, described below) and, where appropriate, the *Fisheries Act*.

The concept of virtual elimination was introduced into federal legislation by way of CEPA 1999. Under the Act, virtual elimination is the reduction of a toxic substance released into the environment to a quantity or concentration below that which can be accurately measured using sensitive but routine sampling and analytical methods. For those toxic substances that meet the requirements of the Act, including those that are persistent and bioaccumulative, result primarily from human activity and are not naturally occurring radionuclides or naturally occurring inorganic substances, CEPA 1999 (under subsection 77(4)) requires virtual elimination of the substance.

Following the addition of the substance and its level of quantification to the Virtual Elimination List, subsection 65(3) of the Act requires the development of a regulation that sets the quantity or concentration of a substance that may be released (referred to as a release limit) into the environment. When determining release limits, the Ministers will consider information concerning sensitive and readily available analytical methods and will also take into account environmental or health risks and any other relevant social, economic or technical matters.

CEPA 1999 came into force on March 31, 2000, following an extensive Parliamentary Review of the "original" 1988 *Canadian Environmental Protection Act* (CEPA). Parliament decided that the provisions and operations under the Act should be reviewed every five years after its coming into force. On April 5, 2005, the House of Commons Standing Committee on Environment and Sustainable Development was assigned the task of undertaking the review. This Standing Committee will determine when the review will begin and its scope.

[50] www.wssd-smdd.gc.ca/canada_at_wssd/national_report_e.cfm

[51] http://laws.justice.gc.ca/en/C-15.31/

2.3.1.2 The *Pest Control Products Act*[52]

The federal legislative authority for the regulation of pesticides in Canada is the *Pest Control Products Act* (PCPA). The Pest Management Regulatory Agency (PMRA),[53] an Agency of the Crown under the Minister of Health, administers the PCPA for the federal government. Under the PCPA, a pesticide is a chemical, organism or device used to control, destroy, repel, attract or reduce pests. This includes, for example, insecticides, herbicides and fungicides that are used in agriculture, forestry, industry, public health and domestic settings. Any pesticide imported into, sold or used in Canada must first be registered under the PCPA.

A pesticide cannot be registered under the PCPA unless the PMRA determines that any associated risks to people and the environment are acceptable. The product must also serve a useful purpose. Any aspect of the pesticide, including all uses, downstream effects and disposal, may be taken into account during this pre-market assessment. The onus rests with the applicant to conduct extensive tests to demonstrate that the risks and value of the product are acceptable.

Pesticides are exempt from the notification and assessment requirements of CEPA 1999 because the PCPA provides for notice prior to manufacture, import or sale and an assessment of whether a substance is toxic. Acts meeting these exemption criteria are listed in Schedules 2 and 4 of CEPA 1999; the PCPA was listed in these schedules by an Order-in-Council made on August 7, 2001, and in force on September 13, 2001.

If a substance is found to be toxic or capable of becoming toxic, it may be added to the List of Toxic Substances established under CEPA 1999, but it would be regulated under CEPA 1999 only if the aspect of the substance that required regulation was not regulated under another Act of Parliament in a manner that provides sufficient protection to the environment and human health. Thus, although the List of Toxic Substances may include pesticides, pesticides *per se* are not regulated under CEPA 1999.

The PCPA provides comprehensive regulation for pesticides and is tailored to the unique use patterns and risks associated with these products.

Under the PCPA, Canada has already taken action on many POPs. The properties of many of the POPs pesticides prompted severe use restrictions by the mid-1990s. The use of all Stockholm POPs pesticides registered in Canada has since been completely discontinued.

2.3.1.3 The Toxic Substances Management Policy[54]

The federal TSMP puts forward a preventive and precautionary approach to deal with substances that enter the environment and could harm the environment or human health. Its key management objectives are:

- the virtual elimination from the environment of toxic substances that result predominantly from human activity and that are persistent and bioaccumulative (Track 1 substances); and
- the management of other toxic substances and substances of concern, throughout their entire life cycles, to prevent or minimize their release into the environment (Track 2 substances).

Under the TSMP, the ultimate objective of eliminating a Track 1 substance from the environment is set irrespective of socioeconomic factors. Nevertheless, management plans such as targets and schedules to achieve that long-term objective will be based on analyses of environmental and human health risks, as well as social, economic and technical considerations.

A substance is considered "toxic" under the Policy if, after a scientific assessment or decisions taken under federal programs, it either meets or is equivalent to the definition of a "toxic substance" found under CEPA 1999. Substances that meet all four criteria (persistence, bioaccumulation, toxicity and primarily the result of human activity) are classified as Track 1 substances, and the management objective under the TSMP is

[52] http://laws.justice.gc.ca/en/P-9/

[53] www.pmra-arla.gc.ca/

[54] www.ec.gc.ca/toxics/TSMP/en/execsum.cfm

virtual elimination. This concept of "virtual elimination" was later incorporated into CEPA 1999. If some, but not all, of the criteria are met, the substance is classified as a Track 2 substance, and a life cycle management objective applies.

All POPs listed under the Stockholm Convention at its coming into force are designated as Track 1 substances under the TSMP and targeted for virtual elimination.

Following the development of the federal TSMP, the CCME endorsed the national *Policy for the Management of Toxic Substances* (PMTS), which is based on the management objectives of the federal policy. The adoption of this policy by the CCME meant that all governments in Canada concluded that persistent, bioaccumulative, anthropogenic, toxic substances should be virtually eliminated.

2.3.2 Key provincial/territorial legislation and policies

All provinces and territories have legislation and regulations to manage air quality, toxic substances and/or pesticides (see Table 2-1). Most provinces and territories have statutes dealing with environmental protection, with regulations and/or permitting or approvals systems for stationary point sources that discharge pollutants to the atmosphere.

Table 2-1: Key provincial/territorial legislation and policies

Province/territory	Legislation/regulations
British Columbia	· *BC Environmental Management Act* · Hazardous Waste Regulation · Various other regulations · *Pesticide Control Act*
Alberta	· *Environmental Protection and Enhancement Act* · Approvals and Registrations Regulation · Activities Designation Regulation · Substance Release Regulation · Release Reporting Regulation · Pesticide (Ministerial) Regulation · Pesticide Sales, Handling, Use and Application Regulation
Saskatchewan	· *Clean Air Act* · Clean Air Act Regulations
Manitoba	· *Environment Act* and Regulations · Incinerators Regulation · Peat Smoke Control Regulation · Pesticides Regulation · *Pesticides and Fertilizers Control Act* and its associated regulations
Ontario	· *Environmental Protection Act* · *Pesticides Act* and Regulations · Ontario Regulation 419/05 - General Air Pollution · Various other regulations

(CONTINUED ON NEXT PAGE)

Table 2-1: Key provincial/territorial legislation and policies (CONTINUED)

Province/territory	Legislation/regulations
Quebec	· *Environmental Quality Act* · Quality of the Atmosphere Regulations · *Pesticides Act* and associated regulations · Regulation respecting permits and certificates for the sale and use of pesticides · Regulation respecting hazardous materials · Regulation respecting solid waste · Industrial Waste Reduction Program (certificates for existing plants)
New Brunswick	· *Clean Air Act* · *Pesticides Control Act* · Air Quality Regulations · Pesticides Regulations
Nova Scotia	· *Environment Act* · Activities Designation Regulation · Air Quality Regulations · PCB Management Regulations · Pesticides Regulations · Dangerous Goods Management Regulations · Emergency Spill Regulations
Prince Edward Island	· *Environment Act* · Air Quality Regulation · *Pesticide Control Act*
Newfoundland and Labrador	· *Environmental Protection Act* · Air Pollution Control Regulations · Pesticide Control Regulations · Storage of PCB Wastes Regulations · Waste Management Regulations · Environmental Assessment Regulations
Yukon	· *Environment Act (1991)* · Pesticides Regulations · Air Emissions Regulation
Northwest Territories	· *NWT Environmental Protection Act* · *Pesticide Act*
Nunavut	· *Nunavut Environmental Protection Act* · *Pesticide Act*

Responsibilities for pesticides are shared by federal, provincial/territorial and municipal jurisdictions, as shown in Table 2-2.

Table 2-2: Federal, provincial/territorial and municipal responsibilities for pesticides

Federal (PMRA)	Provincial/territorial	Municipal
· *Pest Control Products Act* and regulations · Pesticides registration and reevaluation · Human health and safety · Environmental impact · Value (including efficacy) assessment · Alternative strategies · Compliance and enforcement	· Transportation, sale, use, storage and disposal · Training, certification and licensing of applicators and vendors · Spills and accidents · Permits and use restrictions · Compliance and enforcement	· By-laws for municipal (and in some case, private and residential) lands

2.4 Contribution of Canadians to Canada's environmental quality

The Government of Canada recognizes the inherent right of self-government by Aboriginal peoples as an existing right within section 35 of the *Constitution Act, 1982*. Recognition of the inherent right is based on the view that the Aboriginal peoples of Canada have the right to govern themselves in relation to matters that are internal to their communities, integral to their unique cultures, identities, traditions, languages and institutions, and with respect to their land and resources.

In 1997, several northern Aboriginal organizations, the Council for Yukon First Nations, Dene Nation, Inuit Circumpolar Conference (ICC) and Inuit Tapiriit Kanatami, formed the Canadian Arctic Indigenous Peoples against POPs (CAIPAP). Representatives of CAIPAP were part of Canada's delegation during the negotiations leading up to the Stockholm Convention. ICC and Arctic Athabaskan Council (AAC)[55] representatives also participated as members of Canada's delegation at the first Conference of the Parties to the Stockholm Convention (COP-1). Appendix A includes two case studies documenting the experiences of northern Aboriginal peoples with POPs and the contributions of the ICC and AAC to the Stockholm Convention and control of international POPs.

Sheila-Watt Cloutier presenting a gift of Inuit carving to COP-1 President Mariano Arana of Uruguay

Photo courtesy of: IISD/Earth Negotiations Bulletin
Note:
In presenting the gift, Ms. Watt Cloutier remarked: "Let this drum dancer symbolize our connectivity, north and south and call us all to action. By hosting the first Stockholm COP, Mr. President, Uruguay has answered the call."

[55] The AAC was created in 2000, in part to represent the interests of Athabaskan peoples at the international forum of the Arctic Council. Canadian members are the Council of Yukon First Nations, the Dene Nation and Métis Nation.

In 1999, Sheila Watt-Cloutier, elected Chair of the Inuit Circumpolar Conference, presented an Inuit soapstone statue of mother and child to the INC, which has been displayed at all subsequent INC sessions and at COP-1. In April 2005, Ms. Watt-Cloutier received the "Champions of the Earth" award from UNEP. The award recognized her successful efforts to persuade the world to conclude the Stockholm Convention and her contributions in addressing global climate change.

The Canadian Environmental Network (CEN)[56] is a national network of over 700 community-based, regional and national environmental NGOs and provides an effective consultation mechanism for capacity building within the broader environmental community. The CEN played an important role in developing Canada's approach during negotiation of the Convention, and a CEN representative served as a member of the Canadian delegation at each of the INC sessions and at COP-1. The CEN continues to provide federal and provincial/territorial governments with its views and advice regarding the management of POPs in Canada.

Close-up of the carving: Inuit drum dancer

Photo courtesy of: IISD/Earth Negotiations Bulletin

There are various industry-led initiatives aimed at protecting Canada's human health and environment. The most significant initiative undertaken by the Canadian chemical industry is Responsible Care®. This voluntary initiative has grown within the global chemical industry to promote the safe handling of chemical products from inception in the research laboratory through production, distribution, use and disposal. It also involves the public in its decision-making processes. Initiated in Canada in 1987, Responsible Care® has expanded to 52 countries. It is a new ethic for the safe and environmentally sound management of chemicals throughout their life cycle. It commits companies to improved environmental, health and safety performance through implementing six Codes of Management Practices. The six Codes stretch across all business activities and include a comprehensive set of management practices that are designed to continuously improve virtually every aspect of a product's life cycle.[57]

Another example is an initiative to accelerate elimination of existing PCBs in Ontario. A PCB phase-out award program is being implemented under the Canada–United States Great Lakes Binational Toxics Strategy. The award program recognizes the efforts of Ontario-based companies that have phased out all (or at least 90%) of their high-level PCBs.[58] These voluntary efforts contribute to Canada's Great Lakes Binational Toxics Strategy commitment of a 90% reduction of high-level PCBs (previously or currently in service) and to accelerating the destruction of stored high-level PCB wastes that have the potential to enter the Great Lakes basin.[59]

Part of Canada's Women's Health Strategy is the reduction of environmental hazards that threaten women's health. Under this strategy, Canada will accelerate screening and assessment of new and existing substances, improve management and control of

[56] www.cen-rce.org/

[57] www.ccpa.ca/ResponsibleCare/

[58] As of 2006, eight companies have received PCB phase-out awards: Hydro One, StelPipe Inc., Slater Steels, Enersource Hydro Mississauga, the City of Thunder Bay, Canadian Niagara Power, Ontario Power Generation's Nanticoke Generating Station, and General Motors of Canada's St. Catharines Powertrain Operations Plant.

[59] K. De, Environment Canada, personal communication, 2006.

Aboriginal representatives meet Nelson Mandela, former President of the Republic of South Africa, at INC-5 in December 2000

Photo by: T. Fenge © Inuit Circumpolar Conference
Note:
Pictured (L to R): Larissa Abryuotina (Russian Association of Indigenous Peoples of the North), Carol Mills (Council of Yukon First Nations), Sheila Watt-Cloutier (Inuit Circumpolar Conference Canada), Nelson Mandela, Paul Okalik (Premier of the Nunavut Territorial Government), Cindy Dickson (Council of Yukon First Nations), Robert Charlie (Chief, Champagne/Aishihik First Nation, Council for Yukon First Nations).

toxic substances and track progress. Canada recognizes the key role that Indigenous women play in environmental health and their sensitivity to environmental change. It supports the involvement of Indigenous women in federal efforts to meet commitments under the United Nations Convention on Biological Diversity and in activities of circumpolar countries to enhance the contribution of Indigenous and northern women to sustainable development.

Many municipalities in Canada have adopted environmental initiatives. Local authorities generally include environmental and social considerations in their official plans, planning by-laws and general policies. The Federation of Canadian Municipalities (FCM) is the structure that coordinates and consolidates partnerships among municipalities throughout the provinces and territories.

National and provincial roundtables that include private, non-profit and public sector members are another example of coalition-building institutions that identify, explain and promote the principles and practices of sustainable development.

Other non-governmental structures also play a key role in Canada's environmental management regime. For example, the International Institute for Sustainable Development (IISD) promotes sustainable development in decision-making internationally and within Canada. The IISD also provided reporting services for negotiations related to the Stockholm Convention. The Public Policy Forum is a non-partisan, non-profit organization aimed at improving the quality of government in Canada through better dialogue between government, the private sector and the voluntary sector. Institutions (e.g., universities, foundations) are also important to furthering understanding of POPs.

3. MEASURES TO REDUCE OR ELIMINATE RELEASES FROM INTENTIONAL PRODUCTION AND USE

Walruses resting on an iceberg near Digges Islands

Corel Corporation © Environment Canada

Article 3 of the Convention obligates Parties to prohibit and/or take the legal and administrative measures necessary to eliminate the production, use, export and import of POPs that are *intentionally* produced. Restrictions on production and use are applicable for DDT, which is an important control for malarial outbreaks. The reader is referred to the Convention for the full text of Article 3.

Table 3-1 provides a summary of the status of management actions for each of these intentionally produced chemicals in Canada. The table demonstrates that Canada has already taken action to prohibit and/or take the legal and administrative measures necessary to eliminate the production and use of *all* of the intentionally produced chemicals under the Stockholm Convention.

Note: Text that appears in blue shading (except that in square brackets) directly quotes the Convention text.

Table 3-1: Management actions for intentionally produced chemicals in Canada

Substance	Management action
Aldrin	Pesticide, registration discontinued, 1990
Chlordane	Pesticide, registration discontinued, 1998
DDT (+ DDD + DDE)	Pesticide, registration discontinued, 1985 Chemical, prohibited[a] under CEPA 1999 regulations
Dieldrin	Pesticide, registration discontinued, 1990
Endrin	Pesticide, registration discontinued, 1990
HCB	Pesticide, registration discontinued, 1976 Chemical, prohibited under CEPA 1999 regulations
Heptachlor	Pesticide, registration discontinued, 1985
Mirex	Pesticide, never registered Chemical, never used in Canada, prohibited under CEPA 1999 regulations
PCBs	Industrial chemical, prohibited[b] and use restricted to specified equipment under CEPA 1999 regulations
Toxaphene	Pesticide, registration discontinued, 1982

Notes:

[a] Under CEPA 1999, the Prohibition of Certain Toxic Substances Regulations, 2005 prohibit the manufacture, import, use, process, sale or offer for sale of certain toxic substances (with specified minor exceptions).

[b] Under CEPA 1999, the Chlorobiphenyls Regulations, 1991 prohibit the manufacture, process, use, offer for sale or import of PDBs with specified exemptions.

3.1 Summary of obligations

Article 3 and Annexes A and B of the Convention obligate Parties to do the following:

3.1.1 Prohibit and/or take the legal and administrative measures necessary to eliminate production and use of Annex A chemicals

3.1 (a) Prohibit and/or take the legal and administrative measures necessary to eliminate:

(i) Its production and use of the chemicals listed in Annex A subject to the provisions of that Annex

- Annex A chemicals as of the date of entry into force of the Convention are aldrin, chlordane, dieldrin, endrin, heptachlor, HCB, mirex, toxaphene and PCBs.

3.1.2 Restrict production and use of specific chemicals; DDT as of the date of entry into force of the Convention

3.1 (b) Restrict its production and use of the chemicals listed in Annex B in accordance with the provisions of that Annex.

- The only chemical listed in Annex B as of the date of entry into force of the Convention is DDT.

3.1.3 Prohibit and/or take the legal and administrative measures necessary to eliminate import and export, except in specified situations

3.1 (a) Prohibit and/or take the legal and administrative measures necessary to eliminate:

(ii) Its import and export of the chemicals listed in Annex A in accordance with the provisions of paragraph 2

- The provisions of paragraph 2 of Article 3 of the Convention relate to circumstances when imports and exports are allowed, as follows:

3.2 Each Party shall take measures to ensure:

(a) That a chemical listed in Annex A or Annex B is imported only:

(i) For the purpose of environmentally sound disposal as set forth in paragraph 1 (d) of Article 6; or

(ii) For a use or purpose which is permitted for that Party under Annex A or Annex B;

(b) That a chemical listed in Annex A for which any production or use specific exemption is in effect or a chemical listed in Annex B for which any production or use specific exemption or acceptable purpose is in effect, taking into account any relevant provisions in existing international prior informed consent instruments, is exported only:

(i) For the purpose of environmentally sound disposal as set forth in paragraph 1 (d) of Article 6;

(ii) To a Party which is permitted to use that chemical under Annex A or Annex B; or

(iii) To a State not Party to this Convention which has provided an annual certification to the exporting Party. Such certification shall specify the intended use of the chemical and include a statement that, with respect to that chemical, the importing State is committed to:

a. Protect human health and the environment by taking the necessary measures to minimize or prevent releases;

b. Comply with the provisions of paragraph 1 of Article 6; and

c. Comply, where appropriate, with the provisions of paragraph 2 of Part II of Annex B.

The certification shall also include any appropriate supporting documentation, such as legislation, regulatory instruments, or administrative or policy guidelines. The exporting Party shall transmit the certification to the Secretariat within sixty days of receipt.

- Paragraph 1 (d) of Article 6 includes specific obligations for each Party to take appropriate measures related to such wastes, including products and articles upon becoming wastes. Canada's actions with respect to this section are addressed in Chapter 6 of this Plan.

3.1.4 Aim to prevent the production and use of new pesticides or new industrial chemicals exhibiting characteristics of POPs

3.3 Each Party that has one or more regulatory and assessment schemes for new pesticides or new industrial chemicals shall take measures to regulate with the aim of preventing the production and use of new pesticides or new industrial chemicals which, taking into consideration the criteria in paragraph 1 of Annex D, exhibit the characteristics of persistent organic pollutants.

3.1.5 Take Stockholm Convention characteristics into consideration when assessing chemicals in use

3.4 Each Party that has one or more regulatory and assessment schemes for pesticides or industrial chemicals shall, where appropriate, take into consideration within these schemes the criteria in paragraph 1 of Annex D when conducting assessments of pesticides or industrial chemicals currently in use.

- Annex D details the information requirements and screening criteria for Parties wishing to submit a proposal to list a chemical under the Convention. The Annex lists criteria for persistence, bioaccumulation, long-range environmental transport and adverse effects.

3.2 Prohibit and/or take legal and administrative measures necessary to eliminate production and use of Annex A chemicals

3.2.1 Current actions regarding the elimination of production and use of Annex A chemicals

There are eight pesticides identified for elimination of production and use under the Stockholm Convention: aldrin, chlordane, dieldrin, endrin, heptachlor, HCB (also used as an industrial chemical), mirex and toxaphene. These eight pesticides have never been produced in Canada. They are all targeted for management as Track 1 substances under the federal TSMP, with the objective of virtual elimination. Under the PCPA, there are no registered uses for these eight pesticides. Unless registered, a pesticide may not be imported, sold or used in Canada. Canada refuses entry for unregistered pesticides and returns them to the exporter.

Since none of the Stockholm Convention POPs pesticides are registered, their sale or use in Canada is prohibited under the PCPA.

Annex A chemicals include the industrial chemicals HCB and mirex. The federal TSMP identifies these chemicals as Track 1 substances and targets them for virtual elimination. They are also included on the List of Toxic Substances in Schedule 1 of CEPA 1999. Regulations under CEPA 1999 prohibit the manufacture, use, sale, offer for sale and import of certain toxic substances (including mirex), with specified minor exceptions (e.g., laboratory use and incidental presence). These regulations also establish concentration limits for HCB in specified products, above which the manufacture, use, sale, offer for sale and import of these products is prohibited.

3.2.1.1 The production and use of PCBs

The remaining class of POPs identified in Annex A of the Convention is PCBs. The Convention sets out a specific regime for PCBs, obligating Parties to eliminate their production and to end their use in equipment following Convention time deadlines. PCBs are included on the List of Toxic Substances in Schedule 1 of CEPA 1999. Canada has prohibited the manufacture, import and sale of PCBs and restricted their use to existing closed electrical and hydraulic systems since 1977.

The Convention exempts all articles in use, while, under Annex A, Part II, requiring the following commitments related to the production and use of PCBs:

- Make determined efforts to eliminate the use of PCBs in equipment by 2025:

> Annex A, Part II
> (a) (i) Make determined efforts to identify, label and remove from use equipment containing greater than 10 per cent polychlorinated biphenyls and volumes greater than 5 litres;
> (a) (ii) Make determined efforts to identify, label and remove from use equipment containing greater than 0.05 per cent polychlorinated biphenyls and volumes greater than 5 litres;
> (a) (iii) Endeavour to identify and remove from use equipment containing greater than 0.005 percent polychlorinated biphenyls and volumes greater than 0.05 litres;

- Promote measures to reduce exposure and risk to control the use of PCBs. Note that the export and import of PCB wastes are addressed in Chapter 6.

> Annex A, Part II
> (b) (i) Use only in intact and non-leaking equipment and only in areas where the risk from environmental release can be minimised and quickly remedied;
> (b) (ii) Not use in equipment in areas associated with the production or processing of food or feed;
> (b) (iii) When used in populated areas, including schools and hospitals, all reasonable measures to protect from electrical failure which could result in a fire, and regular inspection of equipment for leaks;
> (c) Notwithstanding paragraph 2 of Article 3, ensure that equipment containing polychlorinated biphenyls, as described in subparagraph (a), shall not be exported or imported except for the purpose of environmentally sound waste management;

- Not allow recovery of liquids with a PCB content above 50 ppm.

> Annex A, Part II
> (d) Except for maintenance and servicing operations, not allow recovery for the purpose of reuse in other equipment of liquids with polychlorinated biphenyls content above 0.005 per cent;

- Endeavour to identify and manage other articles containing PCBs.

> Annex A, Part II
> (f) In lieu of note (ii) in Part I of this Annex, endeavour to identify other articles containing more than 0.005 per cent polychlorinated biphenyls (e.g. cable-sheaths, cured caulk and painted objects) and manage them in accordance with paragraph 1 of Article 6;

Current regulations under CEPA 1999:

- resrict the use of PCBs to specified products and equipment already in Canada at the time the regulations were put in place;
- set a maximum concentration of 50 ppm by weight that may be contained in products and equipment at the time they are imported, manufactured or offered for sale;

- set a 1 g per day limit on the amount of PCBs that may be released into the environment in the course of commercial, manufacturing and processing activities involving specified equipment and 50 ppm by weight as a general release limit, except for road oiling purposes, where the limit is 5 ppm.

3.2.2 *Proposed actions or processes to consider future actions regarding the elimination of production and use of Annex A chemicals*

The new PCPA (anticipated to come into force in 2006) prohibits the manufacture of unregistered pesticides, providing the authority to eliminate, prevent or restrict the production of pesticides listed in Annex A, none of which are registered for use in Canada.

In addition, the new PCPA will:

- improve health and environmental protection;
- strengthen post-registration control of pesticides and make the registration process more transparent;
- continue to take into account risks due to persistence, bioaccumulation, toxicity and potential for long-range transport;
- provide increased flexibility to initiate a special review if there are reasonable grounds to believe that risks are unacceptable; and
- provide the power to impose export restrictions.

Existing pesticides will all be subject to mandatory:

- adverse effects reporting;
- sales data reporting; and
- periodic reevaluation.

The Prohibition of Certain Toxic Substances Regulations, 2005, a regulation made under CEPA 1999, establishes concentration limits for HCB in specified products. Under these regulations, it is prohibited to manufacture, use, sell, offer for sale or import listed products if the concentration of HCB exceeds identified concentration limits. The Prohibition of Certain Toxic Substances Regulations include reporting and record-keeping requirements that apply to HCB and that will assist with enforcement and compliance efforts. These requirements will also provide Environment Canada with data on the quantity and use of HCB in the Canadian market, which is critical to meeting the objective of virtual elimination of the substance from the environment.

Environment Canada is currently revising its PCB regulatory framework. Environment Canada will develop new PCB regulations to replace the Chlorobiphenyls Regulations and the Storage of PCB Material Regulations. While incorporating most of the current requirements, the proposed regulations will establish specific deadlines to end the use of PCBs. Environment Canada intends to recommend the end of use of PCB equipment containing:

- 500 mg/kg or more of PCBs, by December 31, 2009;
- 50 mg/kg or more to less than 500 mg/kg of PCBs, by December 31, 2014 (except for PCBs located in sensitive areas);
- 50 mg/kg or more of PCBs located in sensitive areas, by December 31, 2009 (drinking water treatment plants, food and feed processing sites, schools at or below the secondary level, hospitals, and senior and child care facilities, including the land on which they are located within 100 m of these facilities); and
- 50 mg/kg or more of PCBs as specified in the regulations, by December 31, 2025, based on practical considerations (light ballasts, pole top transformers, specified equipment in electricity generation, transmission and distribution facilities).

3.3 Restrict the production and use of Annex B chemicals (DDT)

DDT is the only substance identified in the Convention for restricted production and use. Production and use are allowed for disease vector control, and production is allowed when DDT is used as an intermediate in the production of dicofol or as a closed-system site-limited intermediate that is chemically transformed in the manufacture of other chemicals that do not exhibit the characteristics of POPs.

The use restrictions for DDT recognize the value of DDT for public health protection (e.g., vector control to prevent malaria and encephalitis), and DDT is therefore allowed in certain applications. Annex B, Part II stipulates that:

> Each Party that produces and/or uses DDT shall restrict such production and/or use for disease vector control in accordance with the World Health Organization recommendations and guidelines on the use of DDT and when locally safe, effective and affordable alternatives are not available to the Party in question.

3.3.1 Current actions regarding DDT

In Canada, DDT has been identified for management as a Track 1 substance under the TSMP and is targeted for virtual elimination.

DDT was first registered in 1946 and used in Canada to control insect pests in crops as well as in domestic and industrial applications. DDT was never manufactured in Canada. In response to environmental and safety concerns, most uses of DDT were phased out by the mid-1970s. Canada discontinued registration of all remaining pesticidal uses of DDT in 1985, although existing stocks could be sold, used or disposed of until December 31, 1990. After that date, any sale or use of DDT in Canada represented a violation of the PCPA.

Canada refuses entry and returns pesticides to exporters if the substances are not legally registered in Canada. In addition, exports of DDT would be subject to notification under CEPA 1999. No such notifications have been received.

Canadians currently benefit from a marketplace that does not include DDT. There are no known insecticidal or industrial uses. Canadian legislation does not permit its use as an intermediary, and dicofol is not produced in Canada.

DDT is listed on the Domestic Substances List (DSL), the Canadian inventory of substances in commerce in Canada. In 2005, DDT was added to the List of Toxic Substances in Schedule 1 of CEPA 1999 and to the Prohibition of Certain Toxic Substances Regulations, 2005, to ensure that the current situation does not change and that there will be no future uses of DDT in Canada.

> The DSL under CEPA 1999 is an inventory of approximately 23 000 substances manufactured in, imported into, used or in commerce in Canada.

Canada's Ministers of Environment and of Health have finalized the addition of DDT to the Prohibition of Certain Toxic Substances Regulations, 2005. These regulations prohibit the manufacture, use, sale, offer for sale or import of DDT in Canada (with minor exceptions, including laboratory use and incidental presence).

3.4 Prohibit and/or take legal and administrative measures necessary to eliminate import and export of the chemicals listed in Annex A and Annex B

Article 3.2 obligates Parties to ensure that chemicals listed in Annex A or Annex B are:

- imported only for the purpose of environmentally sound disposal or for a use or purpose permitted for the Party under either Annex; and
- exported only for the purpose of environmentally sound disposal, to a Party that has a permitted use of the chemical under either of the Annexes or to a non-Party that certifies that it is committed to comply with certain provisions of the Stockholm Convention.

See Section 3.1 for the Convention's legal text with respect to these obligations.

3.4.1 Current actions regarding the import and export of Annex A and Annex B chemicals

The pesticides listed in Annexes A and B are not registered under the PCPA and so may not be imported. Any pesticide not registered is refused entry and returned to the exporter.

As Canada has no remaining stockpiles of these pesticides and they are not manufactured in Canada, export of these substances does not occur. In addition, exports of these pesticides would be subject to notification under CEPA 1999, with the exception of endrin. No such notifications have been received.

CEPA 1999 regulations prohibit the import of the industrial chemicals mirex and DDT, with specified minor exceptions (e.g., laboratory use and incidental presence). These regulations also prohibit the import of HCB in specified products when established concentration limits are exceeded. Exports of mirex are prohibited except for destruction under CEPA 1999, and HCB and DDT would be subject to notification. No such notifications have been received.

In addition, all Annex A and Annex B chemicals, with the exception of endrin and mirex, are listed under the Rotterdam Convention on Prior Informed Consent Procedure. To meet its obligations under the Convention, Canada has developed the regulations under CEPA 1999. When a substance becomes subject to the prior informed consent (PIC) procedure, Canadian exporters become subject to the provisions of these Regulations and hence are required:

- to apply for a permit to export the substance to countries that are Parties to the Convention. A permit is issued if the importing country accepts those imports. The export permit incorporates any conditions included in the importing country's consent;
- to carry liability insurance for each shipment of PIC substances;
- to provide health and environmental information with each shipment, such as material safety data sheets and labels; and
- to take back shipments when conditions of the permit have been violated.

The regulations apply to all PIC substances. Although not currently a PIC substance, mirex is also subject to some of the above provisions of the regulations. The Rotterdam Convention imposes certain export requirements on substances that are banned or severely restricted in a country, which is the case for mirex in Canada.

3.4.1.1 PCBs

CEPA 1999 regulations control the import of waste containing PCBs. PCBs are not manufactured in Canada, and federal, provincial and territorial regulations strictly control any stockpiles. As is the case with other Annex A and Annex B chemicals, PCBs are subject to the export of substances provisions of CEPA 1999. Additional information on Canada's actions with respect to the export of PCBs as waste is included in Chapter 6 of this NIP.

3.5 Take measures to regulate with the aim of preventing the production and use of new pesticides or new chemicals which, taking into consideration criteria in Annex D, exhibit the characteristics of persistent organic pollutants

Paragraph 3 of Article 3 of the Convention states:

> Each Party that has one or more regulatory and assessment schemes for new pesticides or new industrial chemicals shall take measures to regulate with the aim of preventing the production and use of new pesticides or new industrial chemicals which, taking into consideration the criteria in paragraph 1 of Annex D, exhibit the characteristics of persistent organic pollutants.

Canada has regulatory and assessment schemes for new pesticides and new industrial chemicals, under the PCPA and CEPA 1999, respectively.

3.5.1 Current actions regarding new chemicals and pesticides

3.5.1.1 Toxic Substances Management Policy (TSMP)

The federal TSMP establishes criteria to identify Track 1 substances targeted for virtual elimination. Both CEPA 1999 and the PCPA apply these criteria in their assessment schemes as key criteria for identifying substances for which manufacture and/or use are not acceptable in Canada. Canada may prohibit the import and/or use of substances meeting the persistence, bioaccumulation, toxicity and primarily the result of human activity criteria under the TSMP.

3.5.1.2 Pesticides

Before making a registration decision regarding a new pest control product, the PMRA[60] conducts a comprehensive assessment of the risk and value specific to the proposed use. The value assessment considers whether the use of the product contributes to pest management and if the application rates are the lowest they can be while still effectively controlling the target pest. The risk assessment considers the inherent toxicity, persistence and bioaccumulative nature of the pest control product. It addresses human health and environmental concerns and, for each of these, considers the possible hazards associated with the product as well as the degree to which humans and the non-target environment may be exposed. Pesticides cannot be used until assessments are complete and substances registered. The registration may identify acceptable uses and therefore prohibit all other uses or determine that no uses are acceptable.

3.5.1.3 Industrial chemicals

Under the New Substances Notification regime established by CEPA 1999, Canada's Ministers of Environment and of Health are obligated to assess all "new" chemicals to determine if they are "toxic" to the environment or human health. Substances that are not on the DSL (Canada's inventory of chemicals in use) are considered to be new to Canada. The New Substances Notification Regulations[61] specify the information to be submitted if a new substance is intended for import or manufacture. When Environment Canada receives a new substance notification from a company or individual proposing to import or manufacture a new substance, a joint assessment process is carried out by the Departments of Environment and Health to determine the potential adverse effects of the substance on the environment and/or human health.

Substances suspected of being toxic may be controlled by one of the measures laid out in CEPA 1999, including:

- controls on import and manufacture;
- the prohibition of import and manufacture;
- prohibition pending submission and assessment of additional information determined to be required; or
- conditions respecting significant new activities involving the substance.

3.5.2 Proposed actions or processes to consider future actions regarding new chemicals and pesticides

Canada will continue its current programs related to new pesticides and chemicals, improving them as warranted, and will continue leadership and participation in international fora related to the assessment of substances and the science that informs decision-making about their risks and hazards.

3.6 Take into consideration within assessment schemes for pesticides and chemicals in use the criteria in Annex D when conducting assessments of pesticides

The Convention requires Parties with an existing regulatory and assessment scheme for pesticides to, where appropriate, take into

[60] www.pmra-arla.gc.ca

[61] Additional information about the New Substances Notification Regulations can be found at: www.ec.gc.ca/substances/nsb/eng/index_e.htm

consideration within these schemes the criteria in Annex D when conducting assessments of pesticides and chemicals currently in use. Article 3, paragraph 4, states:

> Each Party that has one or more regulatory and assessment schemes for pesticides or industrial chemicals shall, where appropriate, take into consideration within these schemes the criteria in paragraph 1 of Annex D when conducting assessments of pesticides or industrial chemicals currently in use.

3.6.1 Current actions regarding pesticides and chemicals in use

Approximately 550 pesticide active ingredients and their end-use products are currently registered in Canada. In 2001, Canada's PMRA issued a regulatory directive on reevaluation. Reevaluation is the review of pesticide active ingredients and their end-use products on the basis of updated data and information to determine whether, and under what conditions, their continued registration is acceptable. The Directive stated that reevaluations would take into account the TSMP. The PMRA is currently reevaluating pesticides registered before January 1, 1995. As of September 30, 2004, decisions had been made on 159 active ingredients.[62]

> On November 2, 2004, the Pest Management Information Service noted that there are 535 registered ingredients and end-use products.

Canada complies with the obligation to assess industrial chemicals in use under CEPA 1999, which requires categorization of all substances on the DSL by September 14, 2006, and establishes criteria for the evaluation of existing substances. Section 64 of CEPA 1999 provides specific criteria for assessing toxic substances and provides for consideration of persistence, bioaccumulation and inherent toxicity, as well as human exposure, as key components of priority setting. Priorities for assessment and management actions are based on consideration of categorization results, emerging domestic and international science, as well as coordination with foreign/international assessment activities and obligations.

The TSMP is the overarching policy directive for the assessment of existing substances. Track 1 criteria of the TSMP are either identical or very similar to the POPs criteria of the Convention and meet the "taking into consideration" requirement.

3.6.2 Proposed actions or processes to consider future actions regarding pesticides and chemicals in use

The new PCPA will require that reevaluations of pesticides be initiated no longer than 15 years after the most recent major decision with respect to registration, reevaluation or special review. Canada may remove these pesticides from the market if required data are not supplied by pesticide companies or if they are determined to pose risks to the environment or human health.

By 2006, Environment Canada and Health Canada are required to categorize all substances listed on the DSL with respect to their persistence, bioaccumulation, inherent toxicity and exposure of humans. Substances that meet these criteria will subsequently be subject to screening-level assessments, using criteria established in the Persistence and Bioaccumulation Regulations under CEPA 1999. Canada will take these assessments into consideration, along with other factors, in making recommendations to the Conference of the Parties on substances to be added to the Convention.

[62] PMRA report to the Standing Committee on Agriculture and Agri-Food, November 25, 2004.

4. REGISTER OF SPECIFIC EXEMPTIONS AND CHEMICALS SUBJECT TO RESTRICTED USE

Skating on the Rideau Canal, Ottawa, Ontario

4.1 Overview

Article 4 of the Convention allows Parties to obtain specific exemptions, e.g., exemptions that are specific to a chemical, a country and a use. These exemptions were included in the Convention because they allow a phase-out period, during which time countries can eliminate production and use and introduce substitute substances and processes. The time period for an exemption is generally five years or less after the date of entry into force of the Convention for the particular chemical. Upon request and in special circumstances, the Conference of the Parties may choose to extend the expiry date of a specific exemption for a period of up to five years.

Parties wishing to use exemptions will be required to submit a report to the Secretariat, and the Conference of the Parties will review the report and make recommendations to the Party requesting the exemption. A public register of specific exemptions will be established and maintained by the Secretariat. In conformity with the requirements of article 4.2, it will include:

> (a) A list of the types of specific exemptions reproduced from Annex A and Annex B;
>
> (b) A list of the Parties that have a specific exemption listed under Annex A or Annex B; and
>
> (c) A list of the expiry dates for each registered specific exemption.

Parties may, at any time, withdraw an entry from the Register if and when the POP is no longer used or produced in that country.

4.2 Annex B chemicals: DDT

As noted in Chapter 3, Annex B, Part II, of the Stockholm Convention provides for specific provisions for restricted use of DDT in disease vector malaria control. Each Party that produces and/or uses DDT must do so in accordance with the World Health Organization (WHO) recommendations and guidelines, and only when locally safe, effective and affordable alternatives are not available. The Register of Specific Exemptions will be maintained by the Secretariat.

> 4 (1) A Register is hereby established for the purpose of identifying the Parties that have specific exemptions listed in Annex A or Annex B. It shall not identify Parties that make use of the provisions in Annex A or Annex B that may be exercised by all Parties. The Register shall be maintained by the Secretariat and shall be available to the public.

Parties using DDT will be required to:

- report on quantities used, conditions of use and relevance to the Party's disease management strategy;
- develop and implement NAPs to:
  - confine use of DDT to disease vector management,
  - implement alternatives to DDT, and
  - take measures to strengthen health care and reduce incidence of disease;
- promote research and development of safe alternative chemical and non-chemical products, methods and strategies for Parties using DDT. Factors to be promoted when considering alternatives or combinations of alternatives

shall include their human health risks and environmental implications. Viable alternatives to DDT shall pose less risk to human health and the environment, be suitable for disease control based on conditions in countries requesting a specific exemption for DDT and be supported with monitoring data.

Under Annex B, Part II, the Conference of the Parties is required to evaluate whether DDT continues to be needed for disease vector control (i.e., when technically and economically feasible alternative products, practices or processes are available), at least every three years and in consultation with WHO.

The Convention also includes general exemptions for PCBs in existing use (with timelines for their phase-out and elimination), POPs in products, quantities of a chemical to be used in laboratory-scale research or as a reference standard, and unintentional trace contamination of final products where POPs are used as intermediate products.

4.3 Canada and specific use exemptions

Canada does not produce or use any of the Annex A substances that will be listed in the Register and therefore did not request any exemptions to be added to it on its behalf. Canada does not produce or use any currently listed Annex B chemicals (i.e., DDT) and therefore does not require an exemption.

Canada's national Ukranian festival, Dauphin, Manitoba

5. MEASURES TO REDUCE TOTAL RELEASES FROM UNINTENTIONAL PRODUCTION

Pouring steel

Under the Stockholm Convention on POPs, Parties are to develop and endeavour to implement an action plan taking into account the obligations set out under Article 5 of the Convention – namely, measures to reduce or eliminate releases from unintentional production of POPs.

The Convention has defined certain POPs for reduction and ultimate elimination from anthropogenic sources in which these substances are unintentionally formed and released. These substances are polychlorinated dibenzo-*p*-dioxins (PCDDs, also referred to as dioxins), polychlorinated dibenzofurans (PCDFs, also referred to as furans), HCB and PCBs.

5.1 Introduction

This chapter is a summary of Canada's National Action Plan (NAP) on Unintentionally Produced Persistent Organic Pollutants (UPOPs), which forms Part II of this document. It identifies Canada's plans for meeting the obligations outlined in the Convention. The Plan presents information on current releases, laws and policies and the strategies that Canada has adopted in its domestic programs to reduce and virtually eliminate these four UPOPs.

Under Article 5 of the Stockholm Convention, Parties are required to take measures, as summarized in Figure 5-1, to reduce total releases of by-product emissions of Annex C chemicals from anthropogenic sources "with the goal of their continuing minimization and, where feasible, ultimate elimination."

In Canada, protection of the environment is a responsibility shared by all levels of government. Canadian programs in science and technology and actions on UPOPs have focused mostly on dioxins and furans, as the most information regarding formation, releases, prevention and control is available for these substances.

5.2 Releases of UPOPs in Canada

Canada produced the *Inventory of Releases: PCDD/PCDF*, which includes multimedia releases from point, area and mobile sources compiled from various information sources. The most recently published version of this inventory (2001) provides release estimates for the year 1999. In addition to the *Inventory of Releases: PCDD/PCDF*, the National Pollutant Release Inventory (NPRI), a mandatory reporting program of pollutant releases and transfers under CEPA 1999, has provided Canadians with information on annual dioxin/furan and HCB releases from publicly owned and private sector facilities since 2000. The NPRI also serves as Canada's pollutant release and transfer register in the sense of Article 10 (5) of the Stockholm Convention.

Estimated annual releases of dioxins and furans to the atmosphere according to the *Inventory of Releases: PCDD/PCDF* were 164 g for 1999 on an international toxic equivalent, or ITEQ, basis. This represents a 62% decline since 1990, when atmospheric releases were estimated to be 427 g ITEQ per year. Releases to water have been virtually eliminated, decreasing about 99% from an estimated 454 g ITEQ in 1990 to 3 g ITEQ by 1997. Estimates of releases to soil have remained unchanged, at about 19 g ITEQ per year.

Figure 5-2 presents the percent contribution of identified source sectors based on these estimates to the total release of dioxins and furans to the atmosphere in 1999.

Figure 5-1: Schematic summarizing obligations of Article 5 of the Stockholm Convention on POPs

Summary* of Measures for Unintentionally produced Persistent Organic Pollutants (UPOPs: PCDD/F, HCB, PCBs)

- Develop **Action Plan** with implementation schedule, 2 years after entry into force for Party.
- **Inventory** current and projected releases.
- **Evaluate** laws and policies.
- **Develop and promote** strategies and review every 5 years.
- **Require BAT**** for new sources identified in Plan and **Part II Annex C** 4 years after entry into force for Party.
- **Promote BAT** for existing sources **Part II** and **Part III, Annex C**, and for new sources **Part III, Annex C**.
- **Promote BEP***** for new and existing sources **Part II** and **Part III, Annex C**.

Source Categories — Part II
Annex C
Require BAT for new sources
Promote BEP

- **Incinerators** (municipal, hazardous, medical, sewage sludge)
- **Cement kilns - hazardous wastes**
- **Pulp production using elemental chlorine**
- **Thermal metallurgical processes** (iron sintering, secondary copper, aluminum and zinc)

Source Categories — Part III
Annex C
Promote BAT/BEP for new and existing sources

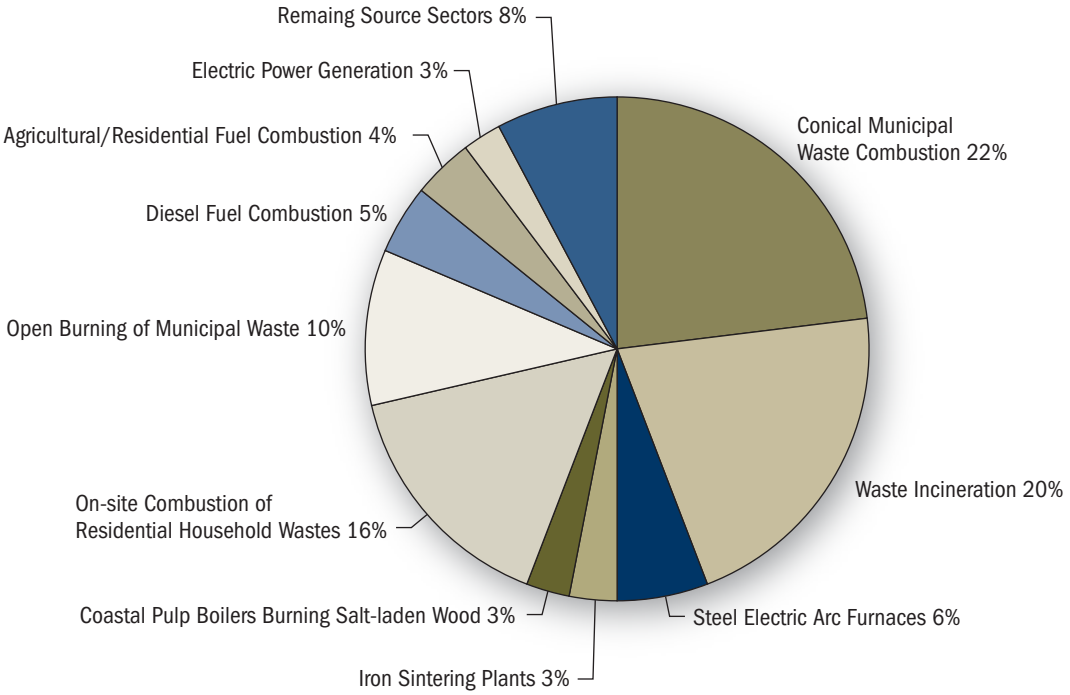
- **Open burning of waste, residential burning**
- **Wood, other biomass firing**
- **Fossil fuel-fired utility, industrial boilers**
- **"Other" thermal metallurgical processes** (secondary lead, secondary steel, primary aluminum, primary base metals (i.e. copper, lead, nickel, zinc), magnesium)
- **Smouldering copper cables**
- **Specific chemical processes** (chlorophenols, chloranil), textile and leather dyeing and finishing
- **Crematoria, destruction of animal carcasses**
- **Motor vehicles, waste oil refineries, vehicle shredder plants**

* See Convention legal text for definitive details

** **Best Available Techniques (BAT)**: most effective and advanced activities to limit, prevent or reduce releases (process description, available techniques, and achievable release levels).

*** **Best Environmental Practices (BEP)**: environmental control measures and strategies

Figure 5-2: Estimated percent contribution of sector dioxin and furan releases to the atmosphere in 1999



Source: Sarah Ternan, Environment Canada

Comprehensive inventories of dioxin/furan and HCB releases to air are prepared annually by Environment Canada for reporting under the UNECE's 1998 POPs Protocol pursuant to the 1979 LRTAP Convention. The inventories include emissions to air from point, mobile and area sources and build upon point source release data reported to the NPRI. The dioxin/furan and HCB inventories will also serve to meet requirements of the Stockholm Convention. The NPRI program is examining possible changes to the reporting requirements for dioxins/furans and HCB, as well as the possible addition of reporting of co-planar PCBs, to meet domestic and international reporting requirements.

Further decreases in releases of dioxins and furans to the atmosphere are anticipated through implementation of the CWS for Dioxins and Furans. This suite of standards was established for five priority sectors and is anticipated to reduce overall annual dioxin and furan releases to the atmosphere as much as 60% by 2010 as compared with 1999 estimated releases. Management strategies outlined for other source sectors will contribute additional, but as yet unquantified, reductions.

5.3 Laws and policies

Federal, provincial, territorial and municipal laws provide the basis for management strategies and tools appropriate for a particular source sector:

- CEPA 1999 is the key legislation of the Canadian government for the management of toxic substances. This legislation contains provisions for the prevention, control and virtual elimination of persistent, bioaccumulative toxic substances.
- The *Canadian Environmental Assessment Act* (CEAA) provides for comprehensive consideration of new projects, which include potential new sources of UPOPs.
- The TSMP of the Canadian government and the subsequent PMTS of the CCME have established a unified, national

approach for the management of toxic substances that are persistent, are bioaccumulative and result primarily from human activity — namely, virtual elimination.

In various provinces and territories, legislation or regulations require the owners/operators of industrial facilities to obtain operating permits or approvals that can contain emission limits or requirements for any atmospheric pollutant, including hazardous air pollutants such as UPOPs. In many cases, permits or approvals are issued for a set length of time and must then be renewed. For new facilities, most provinces and territories require comprehensive environmental assessments and the equivalent of BAT.

5.4 Strategies to reduce releases

Management of UPOPs in Canada has focused largely on releases of dioxins and furans. Reductions in HCB are expected to parallel reductions in dioxin/furan emissions. Less is known about the formation and release of unintentionally produced PCBs. However, it is anticipated that measures to address releases of dioxins/furans should also contribute to the management of unintentionally produced PCBs.

Reduction and elimination strategies are based on a mix of management tools, including regulations, guidelines, environmental codes of practice and other tools, such as education programs. Many of these instruments are based on the application of BAT and BEP. Reduction strategies in Canada include:

- regulations for pulp and paper mills (which have resulted in the virtual elimination of dioxin and furan releases to water from this source);
- CWS for Dioxins and Furans emissions from five priority source sectors. These include:
  - incinerators of municipal waste, hazardous waste, medical waste and sewage sludge;
  - coastal pulp and paper boilers burning salt-laden wood;
  - iron sintering plants;
  - steel manufacturing electric arc furnaces (EAFs); and
  - conical waste combustors of municipal waste.

  These standards include emission limits or activity phase-out, implementation timelines and reporting mechanisms;
- national guidelines for the use of hazardous and non-hazardous waste in cement kilns;
- Environmental Code of Practice for Base Metals Smelters and Refineries, to be published under CEPA 1999;
- a Pollution Prevention Plan Notice for Base Metals Smelters and Refineries, to be published under CEPA 1999; and
- education and technology change-out programs for more diffuse sources, such as on-site residential combustion of household wastes and residential wood combustion.

5.5 Use of best available techniques (BAT) and best environmental practices (BEP)

Through environmental assessment and permitting processes, measures are in place that would in effect require BAT (i.e., BAT = best available techniques) for new waste incinerators, cement kilns, pulp mills and thermal metallurgical processes such as iron sintering plants. Requirements for BAT can also be incorporated through existing provincial and territorial licensing and assessment processes. In addition, through implementation of CWS, BAT is required for sources of priority in Canada, such as steel manufacturing EAFs and coastal pulp and paper boilers burning salt-laden wood. BAT and BEP are also promoted through educational programs and technology change-out programs for other more diffuse sources, such as on-site residential combustion of household wastes and residential wood combustion.

5.6 Use of substitute or modified materials, products and processes

Pollution prevention as embodied in domestic laws and policies promotes the development and "use of substitute or modified materials, products and processes" to prevent the formation and release of UPOPs.

> Article 5 (c) of the Stockholm Convention states that each Party shall "Promote the development and, where it deems appropriate, require the use of substitute or modified materials, products and processes to prevent the formation and release of the chemicals listed in Annex C...."

Early actions taken under CEPA 1999 to address releases of dioxins and furans to water from pulp and paper mills encouraged the industry to switch to an elemental chlorine-free bleaching technology, thus minimizing the formation of dioxins and furans and preventing their release into the environment. Consistent with the third principle of the CCME's Canada-wide Accord on Environmental Harmonization, which set the mandate for their development (i.e., "pollution prevention is the preferred approach to environmental protection"), the CCME CWS for Dioxins and Furans called for the development of pollution prevention strategies. The sector strategies developed provide recommended options or tools aimed at the minimization of air pollutants for jurisdictions to consider and use in whole or in part.

5.7 Education, training and awareness building

Information materials on legislation, policies, management strategies and the environmental and human health effects of toxic substances are available to members of the public through various media, including the Internet. Education and training programs are used to inform and influence individual behaviour in specific areas where individual citizens can contribute to the avoidance or minimization of toxic substance releases (e.g., on-site residential waste combustion).

Awareness has been built through the development of management strategies, such as the CWS for Dioxins and Furans. The CWS process employed multistakeholder advisory groups, including representatives of industry, environmental NGOs, labour groups and provincial, territorial and federal governments, to provide input and advice on the targets and substance of each standard.

5.8 Implementation schedule and strategy review

Schedules for implementation have been established where appropriate through the strategies to reduce releases. Canada will review its strategies for reducing and eliminating releases from unintentional production on a five-year basis. In addition, Canada plans to update its NAP every five years, subject to decisions of the Conference of the Parties and any other relevant factors.

5.9 Conclusion

Significant strides in the reduction and virtual elimination of dioxins and furans have been achieved to date in Canada. Building on these efforts, and as documented in this Plan, Canada is positioned to further contribute to the reduction or elimination of POPs releases from unintentional production.

Canoeing

Photo by: T. Macintosh / © Government of the Northwest Territories

6. MEASURES TO IDENTIFY AND MANAGE STOCKPILES AND WASTES

PCB sign

© Jim Moyes, 2004

Note:

Special black and white labels are available for application to equipment and containers holding PCBs. All levels of government in Canada and all industries are fully cooperating with Environment Canada's voluntary labelling program to identify equipment and machinery that contain PCBs or are contaminated with PCBs. All equipment containing PCBs in a concentration exceeding 50 ppm should be labelled as a precautionary measure to users of the equipment and as a reminder that it must be treated as PCB-contaminated waste when taken out of service.

6.1 Summary of obligations

Article 6 of the Convention relates to:

- chemicals in Annexes A and B (POPs that are intentionally produced); and
- wastes (including products and articles upon becoming wastes) that consist of, contain or are contaminated by chemicals listed in Annexes A and B and Annex C (UPOPs).

It obligates Parties to:

- develop appropriate strategies for identifying stockpiles, wastes and products and articles in use;
- identify, to the extent practicable, stockpiles consisting of or containing chemicals listed in Annex A or B, on the basis of the above strategies;
- manage stockpiles, as appropriate, and in a safe, efficient and environmentally sound manner;
- apply environmentally sound handling, collection, transport, storage and disposal measures to wastes and articles and products upon becoming waste; and
- develop appropriate strategies for identifying sites contaminated by POPs, and, if remediation is undertaken, perform it in an environmentally sound manner.

6.2 Identifying stockpiles and wastes and managing stockpiles

Parties to the Convention are required to develop and implement strategies to identify stockpiles and to manage those stockpiles in a safe, efficient and environmentally sound manner until they are deemed to be wastes.

Specifically, Article 6 states that Parties are obligated to:

(a) Develop appropriate strategies for identifying:
  (i) Stockpiles consisting of or containing chemicals listed either in Annex A or Annex B; and
  (ii) Products and articles in use and wastes consisting of, containing or contaminated with a chemical listed in Annex A, B or C;

(b) Identify, to the extent practicable, stockpiles consisting of or containing chemicals listed either in Annex A or Annex B on the basis of the strategies referred to in subparagraph (a);

(c) Manage stockpiles, as appropriate, in a safe, efficient and environmentally sound manner. Stockpiles of chemicals listed either in Annex A or Annex B, after they are no longer allowed to be used according to any specific exemption specified in Annex A or any specific exemption or acceptable purpose specified in Annex B, except stockpiles which are allowed to be exported according to paragraph 2 of Article 3, shall be deemed to be waste and shall be managed in accordance with subparagraph (d);

6.2.1 Current actions to identify and manage stockpiles and wastes

6.2.1.1 Pesticides

Canada has no stockpiles of POPs pesticides. None of the nine pesticides were ever manufactured in Canada, and their use has been discontinued for many years, through the withdrawal of registrations. Any stocks that existed at the time that registration was withdrawn were to be sold, used or disposed of (between 1981 and 1995, depending on the chemical), after which their sale or use became a violation of the PCPA. Therefore, there is no commercial reason to maintain stockpiles. Canada has established post-registration monitoring and compliance programs to ensure compliance with federal and provincial legislation. Although there is no Convention obligation to do so, federal, provincial and territorial hazardous waste programs address small quantities of retired material in the possession of consumers and have collected and safely disposed of pesticide products that are no longer registered.

An example of a pesticide collection program is Operation CleanFarm, initiated by CropLife Canada, which collects unwanted pesticides in agricultural regions across Canada. Operation CleanFarm is a collaboration of government, industry and the agricultural community with the twin goals of environmental and health protection. All programs involve multistakeholder implementation teams with representatives from provincial environmental and agricultural ministries, as well as agri-retailers, producer groups and the agri-chemical industry.

Information from these programs has not identified substantial quantities of banned POPs that would be considered stockpiles, nor are any such stockpiles expected to exist.

6.2.1.2 PCBs

PCBs were never manufactured in Canada, but up to the late 1970s about 40 000 tonnes were imported for use and have been used in a wide range of products. The federal Chlorobiphenyls Regulations limit the use of PCBs to specified existing products and equipment already in Canada at the time the regulations were put in place. Federal and provincial strategies and initiatives to deal with PCB wastes began in the late 1970s, with federal regulations and a CCME Action Plan to phase out PCBs from service and to develop national codes for storage, handling and destruction of PCBs. Environment Canada is currently developing a renewed PCB regulatory framework under which all stored PCBs wastes will have to be destroyed by specific deadlines.

The CCME has published annual *National Inventories of PCBs in Use and PCB Wastes in Storage in Canada* since 1989. This joint federal/provincial/territorial inventory identifies and classifies (i.e., by high or low concentration levels) amounts of PCBs in use in equipment, in storage and destroyed. Data on the PCBs in use are reported on a voluntary basis by PCB owners and are supplemented by compliance inspections under the Chlorobiphenyls Regulations. Federal and provincial regulations require PCB owners to supply information on PCB wastes in storage.

The *National Inventory of PCBs in Use and PCB Wastes in Storage in Canada, 2003 Annual Report*[63] indicates that nationally, between 1992 and 2003, PCB items in use declined by one-third to 9450 tonnes, and PCBs stored in waste also declined by one-third to 97 061 tonnes. The national declines started in earnest in 1995, when the Swan Hills Waste Treatment Centre in Alberta began operations.

Regulations under CEPA 1999 that address PCB wastes include the Storage of PCB Material Regulations, the Federal Mobile PCB Treatment and Destruction Regulations, the PCB Waste Export Regulations and the Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations. There are also the Interprovincial Movement of Hazardous Waste Regulations under CEPA 1999 and/or provincial regulations that deal with the movement of PCB wastes.

Although there has been no import to date under the Export and Import of Hazardous Waste and Hazardous Recyclable Material

[63] The 2003 Annual Report and previous reports on National Inventories of PCBs in Use and PCB Wastes in Storage in Canada are available at Environment Canada's PCB website: www.ec.gc.ca/pcb/eng/inv_e.htm

Regulations, Canada permits PCB waste imports for environmentally sound disposal. The PCB Waste Export Regulations allow the export of PCB waste to the United States for the purposes of destruction, not including landfilling.

Transportation of PCBs is controlled through regulations under the Transportation of Dangerous Goods Act, with some provinces having additional regulatory requirements.

Through the CCME, Canada has established guidelines related to hazardous waste storage and disposal, including *Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls (PCBs), Guidelines for Mobile Polychlorinated Biphenyl Destruction Systems, Guidelines for Mobile Polychlorinated Biphenyl Treatment Systems, PCB Transformer Decontamination: Standards and Protocols, National Guidelines for the Landfilling of Hazardous Wastes and National Guidelines for Hazardous Waste Incineration Facilities.*

Under the Basel Convention, Canada led the development of the *General Technical Guidelines for the Environmentally Sound Management of Wastes Consisting of, Containing or Contaminated with Persistent Organic Pollutants (POPs)*[64] and the *Technical Guidelines for the Environmentally Sound Management of Wastes Consisting of, Containing or Contaminated with Polychlorinated Biphenyls (PCBs), Polychlorinated Terphenyls (PCTs) or Polybrominated Biphenyls (PBBs)*.[65] These two technical guidelines (hereafter referred to as the technical guidelines on POPs wastes and on PCB wastes, respectively) were presented to COP-1 to the Stockholm Convention in May 2005. These guidelines specify that destruction or irreversible transformation is the preferred management option for POPs. However, the guidelines also specify that, where destruction or irreversible transformation does not represent the environmentally preferable option, disposal methods such as disposal in an engineered landfill can be considered. A COP-1 decision welcomed with appreciation these two guidelines and reminded Parties to take into account the Basel Convention's technical guidelines on POPs wastes.

Provinces and territories establish requirements and authorize PCB waste management facilities within their jurisdictions. Facilities that dispose of PCB wastes receive operating permits, which set out their operating controls and specify emission standards for various media. Under provincial/territorial legislation, the owner of the PCBs or PCB-contaminated material is responsible for their proper use, storage or disposal and is subject to enforcement measures if they are not properly managed.

6.2.2 *Proposed actions or processes to consider future actions to identify and manage stockpiles and wastes*

Canada does not maintain stockpiles of POPs listed under the Convention. Future actions with respect to managing POPs that are in storage (primarily PCBs) are considered to be actions related to wastes.

As noted in Chapter 3, Environment Canada is currently revising its PCB regulatory framework. Work is under way to develop new PCB regulations to replace the Chlorobiphenyls Regulations and the Storage of PCB Material Regulations. While incorporating most of the current requirements, the proposed regulation will establish specific time deadlines for destroying PCBs currently in storage. Environment Canada intends to recommend the destruction of PCB material containing:

- 50 mg/kg or more of PCBs currently in storage, by December 31, 2009;
- 50 mg/kg or more of PCBs that will be stored after the new regulation is in place, no later than one year after the waste is put into storage at the owner's site, the transfer site and the destruction site; and
- 50 mg/kg or more of PCBs, except light ballasts, in sensitive areas; no more storage effective one year after the new regulation is in place.

[64] www.basel.int/techmatters/pops/pops_guid_final.doc

[65] www.basel.int/techmatters/pcbs/pcbs_guid_final-corr.doc

6.3 Environmentally sound handling, collection, transport, storage and disposal

Under Article 6, paragraph 1 (d) of the Convention, each Party is required to "take appropriate measures" so that wastes containing POPs, including products and articles upon becoming wastes, are:

> (i) Handled, collected, transported and stored in an environmentally sound manner;
> (ii) Disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low, taking into account international rules, standards, and guidelines, including those that may be developed pursuant to paragraph 2, and relevant global and regional regimes governing the management of hazardous wastes;
> (iii) Not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants; and
> (iv) Not transported across international boundaries without taking into account relevant international rules, standards and guidelines;

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal defines environmentally sound management as "taking all practicable steps to ensure hazardous wastes and other wastes are managed in a manner which will protect human health and the environment against adverse effects which may result from such wastes." It refers to the way in which hazardous wastes are managed from their point of generation through storage, transport, treatment, reuse, recycling, recovery and ultimate disposal.

Over the years, the Conference of the Parties to the Basel Convention has adopted technical guidelines on environmentally sound management for specific wastes streams, including those related to POPs.

6.3.1 Current actions to apply environmentally sound measures to wastes

6.3.1.1 Handling and disposal

Hazardous waste management facilities in Canada are primarily a provincial and territorial responsibility. Provinces and territories regulate the management and control of treatment facilities and disposal operations, including landfill sites. As part of the federal export and import of hazardous waste regime, the provinces and territories provide consent for the disposal or recycling of imported hazardous wastes within their jurisdiction. Most provinces and territories have established programs to control or restrict the storage, use and disposal of hazardous substances in an environmentally sound manner. The provinces and territories also grant authorizations (i.e., permits, licences and certificates) for carriers that transport hazardous wastes. The federal government works together with the provincial/territorial governments in developing the national hazardous waste management system and establishing national objectives and standards.

PCBs are the primary POP of concern for hazardous waste management in Canada. Federal regulations address storage of PCB material and, for federal institutions, destruction of PCBs. Provincial and territorial regulations and CCME guidelines specifically address the proper handling, storage, treatment and disposal of PCB wastes in an environmentally sound manner. Canada also cooperates with the United States and Mexico under the CEC's NARAP for the Management of PCBs, which is consistent with international and domestic obligations for sound environmental management of PCB wastes.

Canada has open and transparent policies on dealing with hazardous wastes that are consistent with Stockholm Convention obligations. Canada's position on POPs waste has been consistent throughout the negotiation and implementation of the Convention: (i) Canada supports the Basel Convention as the primary vehicle to address POPs wastes; and (ii) Canada does not interpret the waste provisions of the Stockholm Convention as prohibiting the use of high-temperature incineration.

There are also other elements to Canada's approach to POPs and waste management policies, including pollution prevention. Pollution prevention is a cornerstone of federal and national policies and legislation addressing POPs and waste management policies. For example, the CWS for Dioxins and Furans from Waste Incinerators included the development of a pollution prevention strategy that emphasized "identifying and implementing opportunities to prevent the creation of dioxins and furans as well as emissions of air pollutants and ash quality generally." Pollution prevention promotes continuous improvement through the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and wastes at the source.

The Conference of the Parties to the Stockholm Convention is required to cooperate closely with the appropriate bodies of the Basel Convention to address POPs wastes. Canada's domestic rules for the disposal of POPs waste are consistent with the recommendations found within the technical guidelines on POPs wastes that were adopted by the 7th Conference of the Parties to the Basel Convention and welcomed with appreciation at COP-1 to the Stockholm Convention. At the same time, Environment Canada and other jurisdictions are also working towards implementation of the CWS for Dioxins and Furans from Waste Incinerators. While incineration and non-incineration technologies continue to be viewed as environmentally sound methods for the destruction of waste (including POPs waste) in Canada, the use of pollution prevention techniques is advocated wherever they are applicable and effective.

6.3.1.2 Transboundary movement (export and import)

Canada's domestic regulations regarding import and export of hazardous wastes are instrumental in meeting its obligations under a number of international instruments: for example, the United Nations Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989 (ratified by Canada in 1992); the Organisation for Economic Co-operation and Development (OECD) Decision of Council on the Control of Transboundary Movements of Wastes Destined for Recovery Operations, C(2001)107/Final; and the Canada–U.S.A. Agreement on the Transboundary Movement of Hazardous Wastes, 1986 (as amended in 1992). The Stockholm Convention contains waste provisions that are consistent with the Basel Convention. Canada complies with its international obligations under the Basel Convention to ensure that any hazardous wastes imported and exported are handled and disposed of in an environmentally sound manner.

Canada controls and tracks the export and import of hazardous wastes through the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations; POPs-containing wastes are controlled when they exhibit a hazardous characteristic. Transboundary movement of other POPs is more generally categorized and controlled as (organic and chlorinated) hazardous waste.

The Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations, which came into force on November 1, 2005, require that the Canadian exporter or importer of hazardous waste or hazardous recyclable material notify the Minister and receive a permit before any transboundary shipments can take place. A condition of the notification process requires the exporter or importer to identify dioxins and furans and all other POPs contained in the hazardous waste or hazardous recyclable material in excess of 15 µg TEQ/kg (15 ppb) and 50 mg/kg (50 ppm), respectively, consistent with the requirements of the technical guidelines on POPs wastes, developed by the Basel Convention. The individual POPs and their respective concentrations are set out in the export or import permit, and actual shipments are tracked through a movement document.

6.3.2 *Proposed actions or processes to consider future actions to apply environmentally sound measures to wastes*

6.3.2.1 Handling and disposal

Canada is an active participant in international efforts to develop environmentally sound management criteria for hazardous wastes. The federal government works with the provinces, territories, industry and NGOs in the development of standards that will encourage continuous improvement, by Canadian business and industry, in the safe handling and processing of hazardous waste.

6.4 Identifying and managing contaminated sites

Under Article 6, paragraph 1 (e), Parties to the Convention agree to:

> Endeavour to develop appropriate strategies for identifying sites contaminated by chemicals listed in Annex A, B or C; if remediation of those sites is undertaken it shall be performed in an environmentally sound manner.

6.4.1 *Current actions to identify and manage contaminated sites*

Canada began the identification and management of contaminated sites many years ago. Regulation and management of contaminated sites in Canada are primarily provincial/territorial responsibilities; the federal government is primarily responsible for federal lands.

In 1992, the CCME published a *National Classification System for Contaminated Sites* (NCSCS).[66] The system is a method for evaluating contaminated sites according to their current or potential adverse impact on human health and the environment. It was developed to establish a rational and scientifically defensible system for comparable assessment of contaminated sites across Canada. The 12 POPs under the Stockholm Convention would be classified as high-concern contaminants.

In addition to the classification system and a number of other technical and scientific documents, in 1997, the CCME published a comprehensive *Guidance Document on the Management of Contaminated Sites in Canada*.[67] The guidance document sets out a strategy for contaminated site management, including contaminated site identification and assessment and development and implementation of remediation action.

In 1999, the federal government's Contaminated Sites Management Working Group issued *A Federal Approach to Contaminated Sites*. This document as well as several other guidelines and best practices have been developed to provide a common federal approach to managing contaminated sites under federal custody.

Examples of provincial/territorial legislation and management actions related to contaminated sites include the following:

- British Columbia's Hazardous Waste Regulation and Contaminated Site Regulation contain a protocol for the management of PCB wastes. Throughout these regulations, a quality assurance/quality control program is used, which includes analysis of duplicate samples to ensure proper disposal methods and sound environmental procedures, depending on concentrations of PCBs.
- The Government of Newfoundland and Labrador has published a *Management Document on Contaminated Sites.* Between 1994 and 2004, the numbers of PCB-contaminated sites under provincial jurisdiction were reduced from 56 to 8.

The Government of Canada has also established the *Federal Contaminated Sites Management Framework*,[68] an integrated package of policies and best practices advisories that have as their objective the establishment of a consistent approach to

[66] www.ccme.ca/assets/pdf/ntnl_clssfctn_system_e.pdf

[67] www.ec.gc.ca/etad/csmwg/pub/fed_aprch/en/c1_e.htm

[68] www.tbs-sct.gc.ca/pubs_pol/dcgpubs/realproperty/fcsmp-gscf1_e.asp

the management of federal contaminated sites. The framework includes the Treasury Board Federal Contaminated Sites and Solid Waste Landfills Inventory Policy, released on July 1, 2000, followed in June 2002 by the introduction of the Contaminated Sites Management Policy and the Policy on Accounting for Costs and Liabilities Related to Contaminated Sites.

In 2003, the federal government, through Treasury Board, established the Federal Contaminated Sites Accelerated Action Plan.[69] This program was specifically established as an environmental "federal house in order" initiative. Since its inception, some 114 high-risk federal sites have been assessed, with approximately half being funded for risk management/remediation. Sites contaminated with POPs, particularly PCBs, are among the sites being funded for risk management/remediation.

6.4.2 Proposed actions or processes to consider future actions to identify and manage contaminated sites

In 2006, the CCME Soil Quality Guidelines Task Group will update the NCSCS. The revised version will be more objective and simpler to use. Other upgrades to the NCSCS include the consideration of factors specific to northern sites (e.g., permafrost, snow and lack of groundwater) and potential risks associated with First Nations' reliance on local traditional foods and other land resources. The new NCSCS incorporates some of the changes that were developed federally to prioritize contaminated sites under the Federal Contaminated Sites Accelerated Action Plan. As of December 2005, a draft of the revised NCSCS was posted on the CCME website for a six-month public review period. The CCME Soil Quality Guidelines Task Group also plans to conduct further testing of the revised NCSCS with contaminated site data before it is finalized. Further actions with respect to the identification and management of contaminated sites will be taken in accordance with jurisdictional action plans and policies.

6.5 Mandate of the Conference of the Parties

Article 6, Paragraph 2, of the Convention states:

> The Conference of the Parties shall cooperate closely with the appropriate bodies of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal to, *inter alia*:
>
> (a) Establish levels of destruction and irreversible transformation necessary to ensure that the characteristics of persistent organic pollutants as specified in paragraph 1 of Annex D are not exhibited;
>
> (b) Determine what they consider to be the methods that constitute environmentally sound disposal referred to above; and
>
> (c) Work to establish, as appropriate, the concentration levels of the chemicals listed in Annexes A, B and C in order to define the low persistent organic pollutant content referred to in paragraph 1 (d)(ii).

As Party to both the Stockholm and Basel conventions, Canada will continue active participation in working groups tasked with providing guidance on ensuring consistency between the two conventions. As indicated above, under the Basel Convention Canada led the development of two technical guidelines completed in 2005. Parties to the Basel Convention are currently developing technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with dioxins and furans, another one on pesticides (aldrin, chlordane, dieldrin, endrin, heptachlor, HCB, mirex and toxaphene) and one on DDT. Furthermore, the group may also develop one solely on HCB.

[69] www.ec.gc.ca/press/2004/040518_b_e.htm

7. OTHER COMMITMENTS

Infant and mother drumming

© Government of Yukon

7.1 Public information, awareness and education

Under Article 10, each Party is required, "within its capabilities," to promote and facilitate public awareness, education and training activities and to ensure public access to updated information. Each Party is to give "sympathetic consideration" to developing mechanisms for the collection and dissemination of quantitative information on annual releases and disposal of POPs.

Canada makes environmental and human health information on POPs available to the public and has existing labelling and consumer awareness measures. There is a wide range of information provided, from scientific journal articles and workshop proceedings to the transparent processes of substance assessments under CEPA 1999. Public information on POPs is available through a variety of sources, including federal, provincial and territorial Internet sites. As the federal government moves forward with its Government-On-Line initiative, this will likely facilitate the availability of even broader amounts of public information in the future.

The CEPA 1999 Environmental Registry[70] was launched when CEPA 1999 came into force on March 31, 2000. It is a key instrument in meeting the commitment to public participation by providing comprehensive access to information related to the administration of the Act. It also provides an opportunity for the Canadian public to understand how the federal government administers CEPA 1999 by facilitating access, directly and through search capabilities, to public documents.

With the coming into force of the new PCPA, a public registry will facilitate provision of pesticide-related information and allow access to evaluation reports on registered pesticides, as well as information related to the administration of the new PCPA. The public will also be allowed to inspect the test data on which pesticide evaluations are based.

The Northern Contaminants Program (NCP), in addition to conducting research and monitoring, provides northerners with the results of research (e.g., the 2003 *Canadian Arctic Contaminants Assessment Report II*) and information that assists them in making decisions about what foods to eat and how they should be consumed. Further, the NCP specifically addresses vulnerable communities affected by POPs in Canada. The program has identified geographic areas and traditional foods at high risk for POPs contamination and the important link between POPs transfer from mother to child during pregnancy and breastfeeding. As a consequence, communication, awareness, education and training programs have been cooperatively developed for northern Aboriginal people — primarily targeting Inuit women of child-bearing age and pregnant women.

Information from the NCP has been used by other organizations to assist them with their public outreach efforts. For example, the Council of Yukon First Nations has developed a website[71] and guidance materials based on NCP data.

Canada will also communicate findings from programs such as ArcticNet – a Network of Centres of Excellence of Canada,[72] bringing together scientists and managers in the natural, human health and social sciences with their partners in Inuit organizations, northern communities, federal and provincial

[70] www.ec.gc.ca/CEPARegistry/

[71] www.contaminants.ca

[72] www.nce.gc.ca/

agencies and the private sector to study the impacts of climate change in the coastal Canadian Arctic.

The Nasivvik Centre for Inuit Health and Changing Environments is a multidisciplinary research and training centre, located at Laval University and funded by the Canadian Institutes of Health Research. The Centre's goal is to enhance the capacity of Inuit students by supporting training and education in the areas of Inuit health research in Canada, including environmental health issues such as contaminants and climate change.

Canada is working on implementation of the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), which provides a common and coherent basis for defining and classifying hazards and communicating information on labels and safety data sheets. There are four key sectors in Canada for implementation: consumer chemical products, pest control products, the transportation of dangerous goods and the Workplace Hazardous Materials Information System.

The GHS is expected to benefit all countries, international organizations, chemical producers and users of chemicals by: i) enhancing protection of humans and the environment by providing an internationally comprehensible system for hazard communication; ii) facilitating international trade in chemicals whose hazards have been properly assessed and identified on an international basis; iii) reducing the need for duplicate testing and evaluation; and iv) providing a recognized framework for those countries without an existing system. The GHS should help Canada and other Parties contribute to meeting the obligations of Article 10(4): in providing information on POPs and their alternatives, Parties may use safety data sheets, reports and other forms of communication.[73]

The *2004 Update to the CCME's Strategic Implementation Framework for International Commitments on Hazardous Air Pollutants (HAPs)* provides additional information on provincial/territorial and federal initiatives and programs dealing with POPs.[74]

Regarding the collection and dissemination of quantitative information on annual releases and disposal of POPs, Canada will provide this information through existing mechanisms. The NPRI under CEPA 1999 includes facility reporting of dioxin, furan and HCB releases. The *National Inventory of PCBs in Use and PCB Wastes in Storage in Canada* provides annual inventory information on PCBs. PCB disposal and destruction information will be added to the PCB national inventory. These programs will be used to meet Canada's obligations with respect to reporting, as discussed in Section 7.6 of this NIP. These measures go well beyond the Convention's requirement to "give sympathetic consideration."

Presentation of contaminants data to community in Nunavut Territory

© Eric Loring, 2003

Note:

Effective communication of scientific findings to northern communities is an important part of the Northern Contaminants Program.

[73] Health Canada, *Implementing the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals in Canada*. www.hc-sc.gc.ca/ahc-asc/intactiv/ghs-sgh/implement/index_e.html

[74] www.ec.gc.ca/cleanair-airpur/Pollutants/Persistent_Organic_Pollutants_(POPS)-WS8F6FD286-1_En.htm

7.2 Research, development and monitoring

Under Article 11 of the Convention, Parties agree to, within their capabilities (and among other actions):

- encourage and/or undertake, at the national and international levels, appropriate research, development, monitoring and cooperation pertaining to POPs, to their alternatives and to candidate POPs;
- support international research programs; and
- strengthen research capabilities in developing countries and countries with economies in transition.

Canada has a number of domestic programs dealing with research, development and monitoring of POPs, which also contribute to international knowledge. In addition, Canada participates directly in international POPs research and monitoring activities, including assisting capacity building in developing countries and countries with economies in transition. Several of these domestic and international activities are outlined below.

An example of current research and monitoring on POPs in Canada is given by the NCP, which began in 1991 and is an ongoing program. The presence of toxic contaminants in the Arctic ecosystem and their impact on Arctic human health are high-profile northern issues addressed by the NCP. The NCP is part of the larger circumpolar program on POPs, AMAP, and will continue to contribute data to international monitoring programs. Program results gathered during the 1990s demonstrated how POPs are transported from other regions of the globe and deposited in the Arctic, where they accumulate in fat-rich marine species depended upon by Arctic Aboriginal people for food. As a result of this contamination, certain Arctic human populations are exposed to levels of POPs that exceed Health Canada and WHO guideline levels for certain POPs (e.g., PCBs), indicating a level of concern. Of particular concern is exposure to POPs at early life stages, when development is most sensitive to toxic effects. Studies in Canada and other parts of the world have associated human fetal exposure to POPs with reduced birth sizes and weights and subtle changes in neurobehavioural and immunological development.

Human health research and monitoring under the NCP include the following objectives:

- monitor and assess trends (temporal and spatial) in exposure to POPs (those listed under the Stockholm Convention as well as candidate POP chemicals) from maternal/cord blood, human milk and other tissues;
- conduct research to assess the potential effects and risks to humans from consuming traditional/country foods with a focus on the developing fetus and child whose exposure is passed on from the mother and is directly related to her diet; and
- improve methods for modelling dietary exposure and assessing benefits and risks from traditional/country foods and their alternatives, to assist individuals in making informed decisions.

Environmental research and monitoring under the NCP are carried out to:

- assess temporal and geographic trends of POPs and emerging candidate POPs in Arctic air and biota that are important to the diet of Arctic Indigenous people; indicator species include seabirds and their eggs (Northern Fulmars and Thick-billed Murres), marine mammals (ringed seals, beluga whales, narwhal whales, walrus and polar bears), fish (lake trout, Arctic char and burbot), moose and caribou;
- investigate environmental processes that influence the fate and transport of POPs and candidate POPs to and within the Arctic and how these processes influence wildlife exposure;
- promote the development of new and improved techniques for the measurement of POPs and candidate POPs in a variety of environmental media; and
- develop a standard protocol for archiving environmental samples and data in a stable and secure manner that ensures future availability and accessibility.

NCP activities related to Aboriginal partnerships, education and communications include the following:

- develop and provide northerners with effective advice (i.e., culturally sensitive using the appropriate Aboriginal language) and information needed to make informed decisions on their food use, led by the Aboriginal partner organizations of the NCP;
- investigate and promote the nutritional value of certain traditional foods that may be consumed while leading to reduced contaminant exposure (e.g., Arctic char);
- formulate alternative contaminant reduction strategies appropriate for specific target population groups, such as women up to the end of their child-bearing years; and
- ensure open access to NCP results and publications through the program's website.[75]

Monitoring of atmospheric transport and deposition of POPs has been conducted in Canada since the early 1990s and is ongoing. First, the Integrated Atmospheric Deposition Network (IADN),[76] a collaborative effort between Canada and the United States, started in 1990 as a result of Annex 15 of the Great Lakes Water Quality Agreement. The IADN mandate is to measure POPs concentrations in air and precipitation in the Great Lakes region to estimate the atmospheric loadings to the Great Lakes. Results from the IADN have also enhanced Canada's understanding of the fate of POPs in the Canadian environment. Close collaboration with the United States will continue and strengthen with the latest five-year implementation plan signed in 2004. All 12 Stockholm Convention POPs and some candidate POPs are monitored.

Another atmospheric monitoring program is the National Air Pollution Surveillance (NAPS) network.[77] Under the network, selected POPs (principally dioxins and furans) are measured at selected urban sites to assess trends and to aid in identification and verification of source emissions. Also, emissions of selected POPs (mainly dioxins) from stationary sources are measured and assessed as part of the program.

Canada also has several long-term monitoring programs looking at POPs in wildlife. The Great Lakes Herring Gull Monitoring Program was initiated in response to observations of poor reproductive success in colonial waterbirds in the Great Lakes in the early 1970s. Likewise, a variety of seabird species have been monitored on Canada's Atlantic, Pacific and Arctic coasts, and Great Blue Herons are monitored as a bioindicator of the health of the St. Lawrence ecosystem. Other wildlife species, including polar bears, reptiles and amphibians, are being studied. Temporal and trend monitoring of POPs is also carried out in fish in the Great Lakes and in beluga whales in the St. Lawrence River estuary.

In addition to ongoing monitoring networks, such as described above, Canada carries out research and short-term monitoring on a national scale in accordance with the need for information. Federal regional agencies and provinces/territories also conduct monitoring studies. These research and monitoring programs include POPs, replacement chemicals and potential candidate POPs.

These national and regional POPs initiatives can provide information for ongoing risk management of the initial list of 12 Stockholm Convention POPs. They can further strengthen risk assessment and management activities conducted under CEPA 1999 for substances that are potential candidate chemicals for addition to the Stockholm Convention. Analytical developments and research and monitoring data can be directly integrated into assessment and management activities. The fact that POPs undergo long-range transport highlights the importance of international cooperation in determining their environmental presence, sources and fate and how to proceed with risk management.

At the international level, Canada participates in programs such as AMAP,[78] the Canada/Mexico/United States Trilateral Committee for Wildlife and Ecosystem Conservation and Management,[79]

[75] www.ainc-inac.gc.ca/ncp/index_e.html

[76] www.msc-smc.ec.gc.ca/iadn/index_e.html

[77] www.etc-cte.ec.gc.ca/NAPS

[78] www.amap.no

[79] www.cws-scf.ec.gc.ca/birds/trilat_e.cfm

the NAFTA Commission on Environmental Cooperation (CEC)[80] and the International Joint Commission.[81] Through these and other partnering initiatives, Environment Canada and Health Canada encourage and participate in an exchange of information, technology and training of scientists.

AMAP is a working group under the Arctic Council and includes the eight Arctic countries — Canada, Denmark/Greenland, Finland, Iceland, Norway, the Russian Federation, Sweden and the United States. AMAP has produced Arctic assessments for contaminants and human health over the past 10 years, and a POPs assessment was published in 2004. In 2006, AMAP is considering several activities related to the Stockholm Convention and its needs for information from the Arctic. These include making temporal trend monitoring data available from all eight Arctic countries for submission under Article 16 of the Stockholm Convention on POPs; and assessing the occurrence of new contaminants in the Arctic in order to identify potential candidate chemicals for addition to the Convention.

Through the CEC Environmental Monitoring and Assessment Working Group, Canada works to build capacity in Mexico, to develop and seek support for North American networks for monitoring using common protocols developed trinationally and to assess and integrate the knowledge on a North American basis in reports made public in the three countries.

Canada assists developing countries and countries with economies in transition in building their research and monitoring capacities through the Canada POPs Fund and through other bilateral and multilateral mechanisms, as Canada deems suitable. For instance, there are well-known and well-documented methods to measure (sample and analyze) POPs in most matrices (air, water, soil, tissue). Canadian laboratories, both public and private, have specific expertise in analyzing POPs in these media, and there is an opportunity for Canada to share this knowledge with other countries through capacity-building and technology transfer initiatives. As an example of this knowledge transfer, Canada is leading a maternal blood monitoring project under the above-mentioned CEC monitoring and assessment program. This project will ensure that Mexico, the United States and Canada have a comparable program of human maternal contaminant monitoring for the 12 Stockholm Convention POPs and a number of other contaminants. This project will increase analytical capacity in Mexico for these contaminants and ensure comparability through a rigorous quality assurance and quality control program.

As part of Canada's contribution to Article 16, Effectiveness Evaluation, the Global Atmospheric Passive Sampling (GAPS) two-year pilot study was initiated by Canada at over 50 sites around the world in December 2004. The objectives of the pilot study are to demonstrate the feasibility of passive air samplers for conducting global monitoring of POPs; and to investigate the spatial and temporal trends of POPs. The network targets POPs listed under the Stockholm Convention as well as potential candidate POP chemicals. By monitoring atmospheric concentrations of POPs over time and at specific locations around the world, the GAPS approach could be applied to assess the effectiveness of international control measures.

The International Council for Science and the World Meteorological Organization have declared 2007–08 as the next International Polar Year.[82] The "year" will cover 24 months, starting March 1, 2007, and ending March 1, 2009. The Canadian government will provide $150 million in new funding over six years for academic, government and community researchers to carry out innovative, interdisciplinary studies in the Arctic and Antarctic regions. As a key deliverable for the International Polar Year, Canada will focus on climate change impacts and adaptation and the health and well-being of northern communities. It is anticipated that POPs will be included as research issues under these two broad themes.

In summary, Canada will continue to support and develop its national and international efforts related to research on and monitoring of POPs.

[80] www.cec.org/home/index.cfm?varlan=english

[81] www.ijc.org/en/home/main_accueil.htm

[82] www.ipy.org/

Alert Monitoring Station

Photo by: Janice Lang © Defence Research and Development Canada

Note:

At the extreme northern tip of Canada is the Canadian Forces Station, Alert – where the Meteorological Service of Canada has a scientific research station of world-wide importance. Alert is the northern-most observatory in the World Meteorological Organization's Global Atmosphere Watch Network of stations that have been tracking the chemistry of the atmosphere on a global basis for several decades. Alert's location (far away from industrial pollution sources, with no settlements within hundreds of kilometres) makes it the perfect place from which to monitor long-term changes in the chemistry of the Earth's atmosphere. Environment Canada www.msc-smc.ec.gc.ca/acsd/publications/RMD_msc_report/knowledge/knowledge_1_e.html

7.3 Information exchange

Under Article 9 of the Convention, Parties are required to facilitate or undertake the exchange of information among Parties, relevant to:

1. (a) The reduction or elimination of the production, use and release of persistent organic pollutants; and
   (b) Alternatives to persistent organic pollutants, including information relating to their risks as well as to their economic and social costs.
2. The Parties shall exchange the information referred to in paragraph 1 directly or through the Secretariat.
3. Each Party shall designate a national focal point for the exchange of such information.
4. The Secretariat shall serve as a clearing-house mechanism for information on persistent organic pollutants, including information provided by Parties, intergovernmental organizations and non-governmental organizations.
5. For the purposes of this Convention, information on health and safety of humans and the environment shall not be regarded as confidential. Parties that exchange other information pursuant to this Convention shall protect any confidential information as mutually agreed.

To analyse many POPS, it is necessary to remove the chemicals of concern using extraction techniques, as shown here at Environment Canada's Environment Technology Centre

Photo by: Anthony Scullion Photography © Environment Canada

During negotiations leading up to the Convention's entry into force, Canada has shared information with other countries and has responded to requests for information from them, and from the interim Secretariat, and will continue to do so. Canada has programs and initiatives in place that address the exchange of information between national governments and can readily comply with this obligation through continuation of existing strategies. In addition, CEPA 1999 specifically allows for the exchange of information with the government of a foreign state or an international organization with the condition that the information be kept confidential. The new PCPA will similarly allow the sharing of information, including confidential test data and confidential business information, with another government provided that there

is an agreement in place relating to the exchange of information about pesticides. Under both Acts, the responsible Minister must be satisfied that the law of the jurisdiction to which the information would be communicated enables the recipient of the information to prevent public disclosure of the information and the unfair use of the information by third parties for commercial purposes. Such a law would have to be consistent with the provisions of the new PCPA, which prohibit public disclosure of confidential business information, prevent third parties from obtaining copies of confidential test data and establish a data protection policy governing the use of or reliance on such test data by third parties.

Canada provides information and supports demonstration projects that illustrate practical methods to control POPs (such as pollution abatement technologies) and to find alternatives to their use (such as integrated pest management). These programs are sponsored and delivered by Canadian government agencies, often in partnership with Canada's academic and private sectors. Canada also provides information and services on the Internet, such as Environment Canada's Green Lane[83] and other government databases, which are available to other governments and to the public.

Environment Canada's Transboundary Air Issues Branch served as Canada's focal point agency for information exchanged during the interim period of the Stockholm Convention and continues to do so now that the Convention has entered into force, pursuant to Article 9 of the Convention. Other federal departments or agencies, such as Foreign Affairs Canada and the PMRA, can also communicate with the Secretariat of the Stockholm Convention pursuant to their departmental mandates. The UNEP Secretariat for the Convention has been informed of these roles.

7.4 Financial assistance

Article 13 of the Convention states that each Party will undertake to provide, within its capabilities, financial support and incentives in respect of national activities intended to achieve the objective of the Convention.

1. Each Party undertakes to provide, within its capabilities, financial support and incentives in respect of those national activities that are intended to achieve the objective of this Convention in accordance with its national plans, priorities and programmes.
2. The developed country Parties shall provide new and additional financial resources to enable developing country Parties and Parties with economies in transition to meet the agreed full incremental costs of implementing measures which fulfill their obligations under this Convention as agreed between a recipient Party and an entity participating in the mechanism described in paragraph 6....
3. Developed country Parties, and other Parties ... may also provide and developing country Parties and Parties with economies in transition avail themselves of financial resources to assist in their implementation of this Convention through other bilateral, regional and multilateral sources or channels.

The remaining provisions of Article 13 relate to the intent of the Article and to the nature of the funding mechanism. A memorandum of understanding between the Conference of the Parties and the Council of the Global Environment Facility (GEF) was approved at COP-1 to enable the GEF to continue operating on an interim basis as the primary financial mechanism for the Convention. In taking on its role as primary financial mechanism, the GEF has developed a new operational program specific to POPs. The GEF has indicated that new and additional resources from donor countries will be required in order to adequately support the implementation of the POPs Convention.

Canada will participate in the financial provisions of the Convention on an ongoing basis through its financial contribution to GEF. The GEF is the Government of Canada's primary mechanism to address global environmental commitments in developing countries. Canada, with the Canadian International Development

[83] www.ec.gc.ca

Agency (CIDA) as lead, has an independent seat on the 32-member GEF Governing Council and is the seventh largest donor to the GEF, contributing $159 million over the four years of the third replenishment (2002–2006). Canada has consistently given 4.28% of the total replenishment: GEF-1 had a total replenishment of US$2 billion, and GEF-2 had a replenishment of US$2.75 billion.

In 2000, Canada established the five-year $20 million Canada POPs Fund, administered by the World Bank, to assist developing countries and countries with economies in transition in building their capacities to deal with POPs and in implementing their obligations under the Convention. While the original five-year period has passed, as of the date of this initial NIP (May 2006), the Fund has a positive balance and remains available for consideration of proposals. The funds are earmarked to assist with:

- development of POPs inventories;
- development of national, regional and subregional strategies and action plans;
- implementation of action plans, including legislation and regulation, enforcement, voluntary measures, risk assessment and environmental monitoring, environmentally sound disposal of wastes and site reclamation, prevention measures and the sustainability of alternative approaches;
- reporting: support for establishment of effective data gathering methods and procedures for reporting on POPs to satisfy future requirements of the Stockholm Convention;
- design and implementation of education and awareness initiatives;
- development, implementation, monitoring, evaluation and promotion of pilot and demonstration activities, including proposals for the destruction/disposal of waste POPs, reclamation of contaminated sites and the use of alternative chemicals; and
- design and implementation of risk assessments: support the use of appropriate analyses/methodologies to determine human health impacts and harm to the environment.

7.5 Technical assistance

Article 12 of the Convention states that Parties to the Convention shall:

> 2. ...cooperate to provide timely and appropriate technical assistance to developing country Parties and Parties with economies in transition, to assist them, taking into account their particular needs, to develop and strengthen their capacity to implement their obligations under this Convention.
> 3. ...include, as appropriate and as mutually agreed, technical assistance for capacity-building relating to implementation of the obligations under this Convention. Further guidance in this regard shall be provided by the Conference of the Parties.
> 4. ...establish, as appropriate, arrangements for the purpose of providing technical assistance and promoting the transfer of technology to developing country Parties and Parties with economies in transition relating to the implementation of this Convention. These arrangements shall include regional and subregional centres for capacity-building and transfer of technology to assist developing country Parties and Parties with economies in transition to fulfil their obligations under this Convention. Further guidance in this regard shall be provided by the Conference of the Parties.
> 5. ... in the context of this Article, take full account of the specific needs and special situation of least developed countries and small island developing states in their actions with regard to technical assistance.

As noted above, the Canada POPs Fund assists developing countries and countries with economies in transition in building their capacities to deal with POPs and in implementing their obligations under the Convention. The Fund is available for a variety of projects, tailored to the needs of specific countries, such as developing POPs inventories; establishing the regulatory mechanisms and building the institutional framework needed to control POPs releases; and finding alternative chemicals or strategies to the use of POPs.

Canada also provides technical assistance to developing countries and countries with economies in transition for capacity building in the fields of chemical management and alternatives to POPs use, such as integrated pest management. For example, CIDA and the International Development Research Centre support sustainable environmental development programs in many countries. CIDA administers the Canadian Consultant Trust Fund, and Industry Canada administers Technology Partnerships Canada.

7.6 Reporting

Under Article 15 of the Convention, Canada has committed to reporting on its implementation of obligations.

1. Each Party shall report to the Conference of the Parties on the measures it has taken to implement the provisions of this Convention and on the effectiveness of such measures in meeting the objectives of the Convention.
2. Each Party shall provide to the Secretariat:
   (a) Statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and
   (b) To the extent practicable, a list of the States from which it has imported each such substance and the States to which it has exported each such substance.
3. Such reporting shall be at periodic intervals and in a format to be decided by the Conference of the Parties at its first meeting.

Canada is in a position to report under Article 15 in the format and at intervals decided by the Conference of the Parties at COP-1: by December 31, 2006, and subsequently every four years. Reporting programs that will assist with this obligation include, but are not limited to:

- the NPRI;
- *Inventory of Releases: PCDD/PCDF*;
- the Residual Discharge Information System;
- the *National Inventory of PCBs in Use and PCB Wastes in Storage in Canada*;
- the National Pesticide Sales Data Base, to be implemented following the coming into force of the new PCPA;
- the Canada–U.S. Great Lakes Binational Toxics Strategy; and
- emissions monitoring by federal, provincial and territorial government agencies and industries.

Canada has prohibited the manufacture, import and export of POPs listed under the Convention, with the exception of waste containing POPs, as discussed in Chapter 6. Therefore, reporting under Article 15(2) will pertain to POPs in waste only.

8. KEY CONVENTION PROCESSES

Snow covering trees in coastal mountains, Garibaldi Provincial Park, B.C.

© Markus Kellerhals

8.1 Effectiveness evaluation

As a Party to the Convention and as called for under Article 16, Canada will cooperate with the Conference of the Parties and the Secretariat in evaluating the effectiveness of the Convention, including assisting with the development of comparable monitoring data and implementation of any ensuing arrangements, in accordance with Canada's technical and financial capabilities.

As part of the foundation for effectiveness evaluation of the Convention, UNEP established a Global Network for the Monitoring of Chemicals in the Environment. The GAPS study was initiated in December 2004 at approximately 50 sites around the world on all continents. The goal is to provide comparable monitoring data through harmonized methodologies on the presence of POPs as well as their regional and global environmental transport. It will focus on the 12 POPs and be designed to accommodate other substances that might be added to the Stockholm Convention in the future. Logistics for this one-year research study — including shipping, receiving and analysis of passive samples — is coordinated through Environment Canada.

Canada was a leader in promoting global monitoring for effectiveness evaluation during the negotiations of the Stockholm Convention. Canadian representatives actively participated in the genesis of this initiative and are assisting in the development of the Global Network for the Monitoring of Chemicals in the Environment. Results from the GAPS study (described in Section 7.2) will be used to comment on the feasibility of the passive sampling approach that was promulgated in the UNEP Guidance for a *Global Monitoring Programme for Persistent Organic Pollutants*.[84]

At COP-1, the Parties recognized the need for a strategic and cost-effective approach to effectiveness evaluation, building on existing human health and environmental monitoring programs to the extent possible. Canada actively participated in an informal discussion group, leading to a Conference of the Parties decision to initiate arrangements to obtain comparable monitoring data to perform effectiveness evaluation.

8.2 Addition of future chemicals to the Convention

The Convention provides a process for future addition of POPs under Article 8. At its discretion, any Party may nominate a substance for consideration by the Conference of the Parties. Nominated substances will be considered for listing under Annexes A, B and/or C (respectively, for elimination, restriction and/or control of releases of unintentionally produced substances). Under Article 19, paragraph 6, a POPs Review Committee was established at COP-1, with membership consisting of appointed experts in chemical assessment or management. The Committee conducts a review process for each candidate substance, as elaborated in Article 8, which involves a series of successive information-gathering and decision-making steps, based on screening criteria (Annex D), risk profile (Annex E) and socioeconomic (Annex F) information. The review process is designed to ensure a flexible and transparent review process, and the Conference of the Parties is able to consider and act on challenges to Committee recommendations along the process. The Conference of the Parties will ultimately decide, in a precautionary manner, whether to add a chemical and specify its

[84] www.chem.unep.ch/gmn/GuidanceGPM.pdf

control measures, in Annexes A, B and/or C. Canada is a member of the initial POPs Review Committee established at COP-1 and will participate in the Committee's technical review process of nominated substances.

Canada identifies candidate substances for risk assessment/management through seven main mechanisms under CEPA 1999: industry information, categorization of the DSL, provincial or international decisions, public nominations, new substances notifications, emerging science and monitoring, and international action, assessment or data collection.

CEPA 1999 requires the Ministers of Environment and of Health to "categorize" the substances on the DSL by September 14, 2006. The DSL contains approximately 23 000 substances that are subject to categorization. Categorization is a prioritization process and involves the systematic identification of substances on the DSL that should be subject to screening assessments (section 74 of CEPA 1999).

The criteria used to categorize substances are described in section 73 of CEPA 1999, which identifies those substances that, in the opinion of the Ministers and on the basis of available information:

(a) may present, to individuals in Canada, the greatest potential for exposure; or

(b) are persistent or bioaccumulative, in accordance with the regulations, and inherently toxic to human beings or to non-human organisms, as determined by laboratory or other studies.

The persistence and bioaccumulation criteria used under CEPA 1999 to set priorities for further domestic work are consistent with the criteria used under the Stockholm Convention. When long-range transport from international sources is identified as a potential source of exposure of Canadians or the Canadian environment, the categorization and screening exercise will provide the information base needed to assist Canada, and other interested Parties, in identifying candidate POPs and supporting and/or reviewing nominations to the Convention.

The new PCPA will also consider substance information from domestic and other sources. Canada will use information from these mechanisms as the basis of any nominations for addition to the Convention. In a similar manner, Canada's participation in responding to substance proposals by other Parties will be based on domestic information, assessments and measures pertinent to such chemicals.

In summary, Canada is participating in the technical review process and is prepared to generate nominations as appropriate and to participate in decisions about additions of new chemicals to the Convention.

Caribou

Note:
The health of caribou herds is essential to the traditional land-based lifestyle of Aboriginal people in northern Canada. Archaeological finds from the Yukon Territory suggest humans have been hunting caribou for more than 13 000 years. Caribou continues to be used today as a staple food source, as well as for clothing and shelter.

9. NIP CONSULTATIONS

Baker Lake, St. John River Valley, New Brunswick

The federal *Policy Statement and Guidelines for Public Participation*[85] recognizes that in order to serve Canadians, a "citizen focus" must be built into all federal government activities, programs and services. An integral component of this service is providing information to citizens and consulting and engaging citizens in the policy development process. The policy statement and guidelines explore new ways in which governments will be able to consult and engage Canadians.

In late 2003, Environment Canada formed a small advisory team, including members from federal government agencies and stakeholders, to assist with planning for multistakeholder consultations on development of Canada's NIP. In January 2004, a discussion document was prepared and made publicly available. In February and March 2004, Environment Canada hosted meetings in Edmonton, Alberta, and Dartmouth, Nova Scotia. A meeting in Gatineau, Quebec, spanned a day and a half, with more detailed explanation of the Convention's obligations. Meetings were announced on Environment Canada's Green Lane (POPs website), and invitations and the discussion document were sent to Aboriginal organizations, organizations focusing on women's and children's health, industrial associations and businesses, environmental NGOs and other levels of Canadian government. Stakeholders were invited to provide written comments and suggestions, in addition to their participation in workshops or if they were unable to attend any of the three sessions. Over 80 individuals from the public, private and non-profit sector attended the sessions. In addition to comments received during face-to-face sessions, six written comments were submitted for consideration.

In general, stakeholders acknowledged that Canada had played and continues to play an important role in the Stockholm Convention and that northern Aboriginal representatives and traditional knowledge were a key contributor to that success. They also agreed that substantial progress had been made in reducing POPs originating in Canada. Stakeholder meetings and subsequent written comments addressed the nature of implementation plans and what level of analysis is required by countries, including Canada, to identify gaps in implementation. Environment Canada was encouraged to submit an early NIP for discussion among the Parties and to maintain stakeholder involvement in its development.

Based on comments received during consultations, Environment Canada produced a draft NIP. The plan was discussed through interdepartmental, intergovernmental and multistakeholder fora and was released for public consultation in early February 2005. The draft NIP was mailed to approximately 200 stakeholders and posted on Environment Canada's CEPA Environmental Registry.[86] Stakeholders with particular knowledge, interest and expertise in the Stockholm Convention and/or POPs were invited to a workshop in Ottawa, Ontario, held on February 14, 2005. At that meeting, stakeholders were informed that the February 2005 draft would be shared for information and feedback with the Conference of the Parties and that stakeholder comments and international feedback received would be considered in the Final NIP, to be delivered to the Conference of the Parties by May 2006. Approximately 25 stakeholders provided comments during that meeting, and additional written comments were delivered to Environment Canada. Reports on the 2004 and 2005 consultations and written comments were attached as appendices to the draft NIP shared at COP-1.

[85] http://canada.justice.gc.ca/en/cons/pc_policy.html

[86] www.ec.gc.ca/ceparegistry

Moving forward, Canada's NIP will be posted on a domestic website as well as the Stockholm Convention website. Canada will continue consulting the public and stakeholders on Stockholm Convention issues through established and successful processes, including i) conducting ad hoc, focused, multistakeholder consultations in preparation for significant Stockholm Convention meetings and events, including future review and updating of the NIP; and ii) public posting of significant consultation documents for comment.

Fly fishing in Kathleen River, Yukon

© Government of Yukon

Toronto skyline

© Canadian Tourism Commission

APPENDIX A

Northern Aboriginal perspectives: Case studies of the experiences of Canada's northern Aboriginals with POPs and their contributions to the Stockholm Convention and control of international POPs

Inuit ice fishing for smelt in winter

© Eric Loring

Case study: Protecting the health and cultures of Arctic Indigenous Peoples by translating POPs science into international policy: The perspective of the Inuit Circumpolar Conference

by Sheila Watt-Cloutier, Terry Fenge and Stephanie Meakin, Inuit Circumpolar Conference[87]

Introduction

In recent years, two important international agreements have been concluded to reduce and eventually eliminate emissions to the environment of key persistent organic pollutants (POPs): the POPs Protocol to the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (LRTAP Convention) and the United Nations Environment Programme (UNEP) Stockholm Convention on POPs.

While important to protect the health and well-being of citizens in all portions of the globe, these agreements are particularly important to Indigenous Peoples in the circumpolar Arctic. Because of the importance of the issue, Inuit and other Arctic Indigenous Peoples participated actively in the global POPs negotiations.

Klaus Toepfer, Executive Director of UNEP, acknowledged the productive role of Arctic Indigenous Peoples at the signing of the Stockholm Convention, and the Convention itself points to this in preambular language similar to that in the LRTAP POPs Protocol:

> *Acknowledging that the Arctic ecosystems and indigenous communities are particularly at risk because of the biomagnification of persistent organic pollutants and that contamination of their traditional foods is a public health issue.*

The preambular provisions of both agreements acknowledge the singular importance of POPs to the Arctic environment and Arctic Indigenous Peoples — an unusual circumstance in international law.

Why and how did this recognition come about? Are there lessons here that may assist states, citizens and non-governmental organizations to implement these agreements? Might some of the principles that guided and promoted the inclusion of Arctic Indigenous Peoples in the negotiations be referenced and/or included in formal implementation plans? Might monitoring of POPs levels in the Arctic environment and biota, including humans, illustrate the impact globally of the international agreements designed to rid the world of POPs? This short case study seeks to flesh out and at least to partially answer these questions with a view to encouraging full and comprehensive implementation of the two POPs agreements.

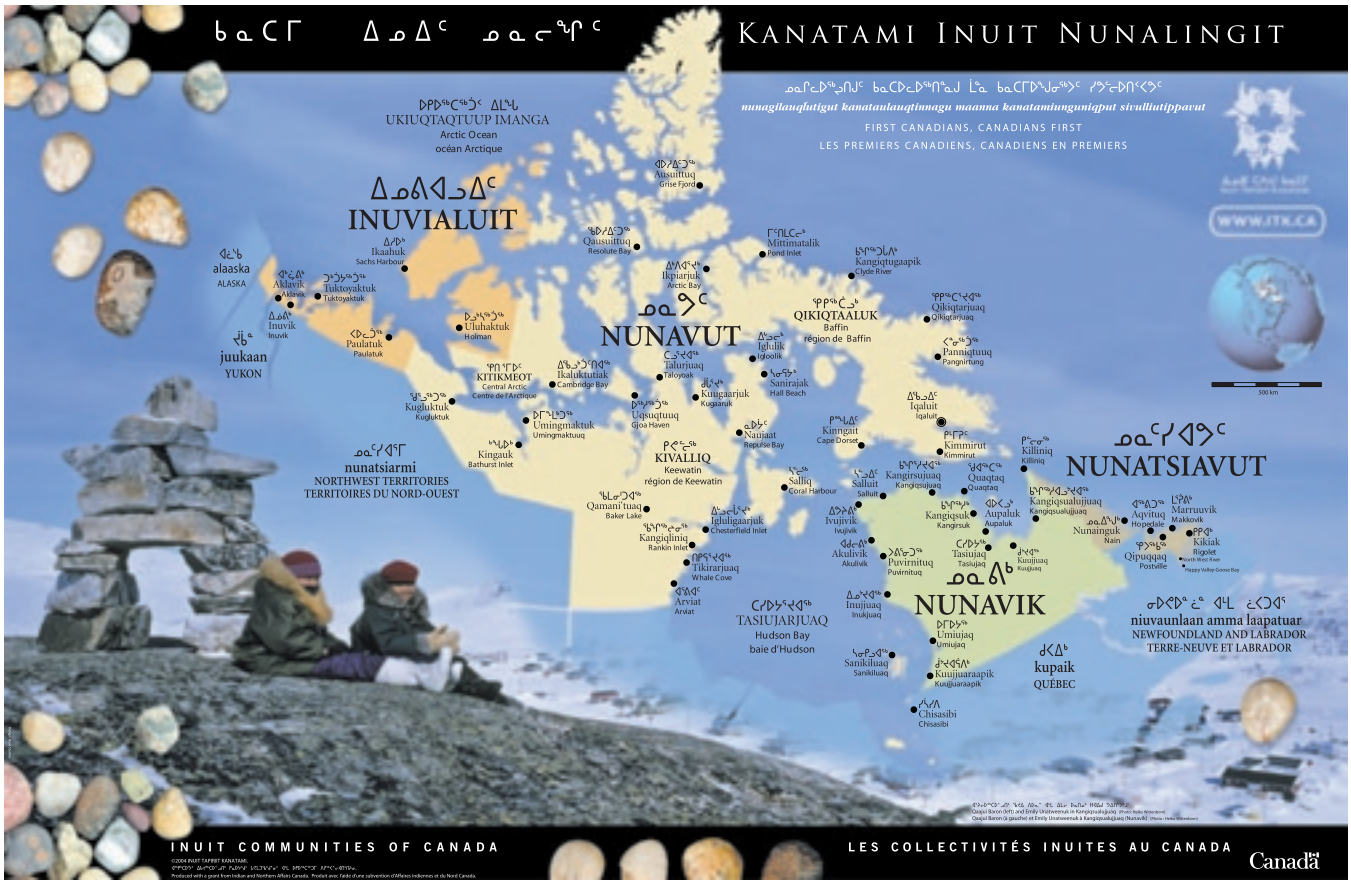
Recognizing an Arctic dimension to the POPs problem

That certain POPs were injurious to public and environmental health has been known for decades. Rachel Carson brought particular attention to this fact through her widely read book *Silent Spring*, published in the early 1960s. It was not until the mid-1980s, however, that an Arctic dimension to this issue emerged publicly.

In 1987, a midwife from Puvignirtuk in Nunavik (northern Quebec) collected breast milk samples from Inuit women in

[87] The authors are responsible for the information and opinions contained in this case study, which do not necessarily reflect the opinion of the Government of Canada.

Figure A-1: Map of Inuit regions and communities



Source: Inuit Tapiriit Kanatami (ITK)

Inuit hunters butchering a walrus

© Eric Loring

this Hudson Bay community as a "blank" control component of a provincial survey carried out by the Public Health Research Unit of the Laval University Medical Research Centre to monitor breast milk contamination by polychlorinated biphenyls (PCBs) and other chlorinated organic contaminants. The gas chromatograph profiles surprised scientists. A very wide range of chemicals was found at levels of concentration between 5 and 10 times higher than in breast milk samples taken from women in southern Canada and the northern United States. Simultaneously, scientists from McGill University reported a high intake of PCBs and high PCB blood concentration in Inuit resident on Broughton Island and on southern Baffin Island, as a result of exposure through the consumption of marine mammals.

In northern Canada, Inuit were surprised to learn that POPs, mostly emitted to the environment far to the south, had invaded

the seemingly pristine Arctic. Having ingested these chemicals by eating traditional country food, Inuit women were passing them to the fetus through the placenta and to infants through breast milk. That living one's life according to ancient tradition and culture might actually harm babies was a deeply shocking prospect. As more research data became available, Arctic Indigenous Peoples throughout the circumpolar world came to share contaminants-related public health concerns.

To Arctic Indigenous Peoples, POPs and heavy metals in country food are not just an environmental or even a public health issue. Contamination of country food raises fundamental questions of cultural survival, for it threatens to psychologically divorce people from their land. Speaking in 1998 on behalf of all Arctic Indigenous Peoples, Sheila Watt-Cloutier, then President of Inuit Circumpolar Conference Canada (ICC), noted:

> *To sustain ourselves during the last century of rapid change, we have treasured more than ever our land and the food which comes from the land. The process of hunting and fishing, followed by the sharing of food, communal partaking of one animal, is the time-honoured ritual which links us to our ancestors and each other.*
>
> *The power of this connection holds us together as a people, gives us the spiritual strength and physical energy to survive the challenges we face....So imagine for a moment if you will the emotions we now feel: shock, panic, rage, grief, despair, as we discover that the food which for generations has nourished us and keeps us whole physically and spiritually is now poisoning us.*

It was well known that several organic contaminants identified in reconnaissance research in northern Quebec and southern Baffin Island displayed immunotoxic properties in both laboratory animals and humans. Contaminant levels in Arctic birds and mammals were reported in several federal government research papers as "exceed[ing] some thresholds associated with reproductive, immunosuppressive and neurobehavioural effects in laboratory animals and some studied wildlife species." A key question was how governments in Canada would respond.

The Northern Contaminants Program (NCP)

Federal and territorial researchers formed an ad hoc committee in 1985 to look into the Arctic POPs issue. The committee concluded that the small amount of PCBs in old military sites in the territorial North could not account for the levels of PCBs reported in Inuit women and children. By the late 1980s, it was assumed that long-range transport of POPs to the Arctic by winds, followed by bioaccumulation and biomagnification in each trophic level of the food web and ingestion by humans eating traditional country food such as seals, whales and walrus, accounted for the high levels of POPs in blood and breast milk. While the outline of the issue was broadly understood at least in theory, the mechanics and long-term effects of chronically high levels of POPs and potential policy responses domestically and internationally were very unclear.

In 1989, the ad hoc committee convened a workshop to develop a long-term interagency research and monitoring strategy to address the issue. The committee prepared a report summarizing the current knowledge on the subject, subsequently published as a special issue of *Science of the Total Environment*. The alarmist press coverage of the committee's work persuaded many Inuit women to stop breastfeeding their infants and to stop eating country food.

Table A-1: Food species consumed by three Aboriginal Peoples in the Canadian Arctic

Food species	Dene/ Metis	Yukon	Inuit
Sea mammals	0	0	14
Land mammals	17	16	14
Birds	16	26	70
Fish/seabirds	20	20	48
Plants	48	40	48
Total	101	102	194

From: *Northern Lights Against POPs; Combatting Toxic Threats in the Arctic*, 2003, p. 26.

Table A-2: Risks and benefits of traditional county food use by Arctic Indigenous Peoples

Risks (unknown or low probability)	Benefits (known with certainty)
Effects of low-level chronic exposure from: · Heavy metals (Hg, Pb, Cd, As) · Organochlorines (aldrin, chlordane, chlorobenzenes, DDT, dieldrin, dioxin, HCH, PAHs, PCBs, toxaphene) · Radionuclides	High nutrient density: · Protein, iron, zinc · Vitamins A, D, E · Fatty acids · Other nutrients
Possible effects from simultaneous multiple contaminants: · Neurobehavioural · Developmental · Immune system · Kidney damage · Cancer	Prevention of chronic disease: · Obesity · Diabetes · Cardiovascular · Other
Synergistic effects with drugs, alcohol, other products	Lower food costs
Accidents during hunting/fishing (known probability)	Physical activity in harvest
	Sociocultural values: · Cultural identity · Preferred taste, flavours, etc. · Contributes to children's education · Shows responsibility for others · Participation in nature conservation · Other

From: *Northern Lights Against POPs; Combatting Toxic Threats in the Arctic*, 2003, p. 38

To deal with the POPs issue, four northern Aboriginal Peoples' organizations, two territorial governments and four federal agencies joined together to develop a response strategy. Included in this strategy was advice to northerners concerning the health aspects of their traditional country food diets (see Tables A-1 and A-2) and research and action to identify contaminant sources and to promote emission controls internationally.

The federal government established a Northern Contaminants Program (NCP) through the 1990 national Green Plan. This program formalized and extended the partnership between federal and territorial agencies and Aboriginal Peoples initiated as a result of the work of the ad hoc committee. With an annual budget of $5–6 million and the ability to lever the use of additional dollars in other programs, the NCP brought together federal and territorial agencies and Aboriginal Peoples' organizations to determine research priorities, to solicit and evaluate research proposals, to discuss and use research results to inform northerners about risks and benefits of dietary choices and to promote international action by the Government of Canada.

The NCP was and remains unusual and innovative. Embedded within it are representatives of Indigenous Peoples — the population in Canada most obviously at risk. Certainly the program was crucial to all that followed, including efforts by the eight-nation Arctic Council to promote international controls to reduce POPs emissions.

NCP Phase One

The key findings of the first phase of the NCP from 1992 to 1997 may be summarized as follows:

- Contaminants have been detected in all components of the northern food chain.
- Animals high in the food chain and high in fat, such as marine mammals, have the highest levels of POPs.
- Sources of POPs and some metals are distant, and the contaminants are transported from the industrial and agricultural areas of the world to Canada's North by air and water currents.
- Inuit women have levels of PCBs and other POPs in their milk and blood that are five times higher than those of women in southern Canada and among the highest levels in the world.
- In parts of the North, levels of PCBs in mothers' blood are at or exceed levels that have been associated, in studies in the Great Lakes region, with neurobehavioural effects on children.

In 1997, the Government of Canada released the *Canadian Arctic Contaminants Assessment Report* (CACAR), a compendium of NCP research to date. This report concluded:

> *Contaminants in the food chain are not thought to pose a direct threat to the health of adult humans. Contaminant levels in traditional/country food are low enough that a single serving, or even many servings, will not make someone sick. However, lifetime stores of contaminants in people may be at a level where the unborn child may be at risk of subtle effects related to learning ability, memory and resistance to infection.*

NCP Phase Two

In 1998, the NCP began a second five-year phase to address immediate health and safety needs of northerners consuming traditional/country foods. The objective of the program was "to reduce and wherever possible eliminate contaminants in traditional harvested foods, while providing information that assists informed decision-making by individuals and communities in their food use." Key objectives of Phase Two included:

- human health research with emphasis on the developing fetus exposed to contaminants through the mother's diet;
- monitoring the health of Arctic peoples and ecosystems and collection of data to support international controls;
- education and communication;
- international policy to promote international control agreements; and
- Aboriginal partnerships.

The geographical ambit of the NCP was extended in its second phase to include northern Quebec and northern Labrador. The Government of Canada published the results of the second phase in 2003 at an international contaminants conference held in Ottawa that brought together more than 300 researchers, government personnel and northerners. The research confirmed that Inuit were at particular threat from POPs because of their dependence on marine mammals and that health effects on Inuit from the exposure needed to be further studied. The research also showed that the northern terrestrial and freshwater food sources such as caribou and fish were among the healthiest in the world.

Inuit women smoking whitefish for preservation

Grise Fjords elders prepare caribou and char for community feast 2003

A circumpolar perspective and AMAP's reports

Following the introduction in the mid-1980s of glasnost and perestroika in the Soviet Union, the eight nations of the circumpolar Arctic initiated discussions that resulted, in 1991, in the adoption of an Arctic Environmental Protection Strategy (AEPS). A key component of this strategy was assessment and monitoring of contaminants to be addressed by the newly established, Oslo-based, Arctic Monitoring and Assessment Programme (AMAP).

Having learned of the transboundary contamination problem in the Arctic through what were essentially reconnaissance studies, the ICC, Sami Council and the Russian Association of Indigenous Peoples of the North (RAIPON) — the original Indigenous Peoples organizations to participate in the AEPS — became staunch supporters of and participants in AMAP. They appreciated the need for a detailed and comprehensive examination of the issue as a prelude to doing something about this global contaminant phenomenon of long-range transport.

Sami Council, RAIPON and ICC assisted AMAP to build upon and add value to national response strategies and drew heavily upon the results of national research programs. Reports to Senior Arctic Affairs Officials of the Arctic governments were provided every six months and to ministers of the environment of the eight Arctic states every two years. As early as 1993, AMAP recommended to ministers:

> *Given the increasing substantiation of reasons for concern related to persistent organic pollutants in the Arctic, the eight Arctic countries agree to support activities that will lead to the development of a protocol to control the emissions of these substances under the UNECE LRTAP Convention.*

Canada, in particular, was well placed as a result of the NCP to provide data and insights to the evolving circumpolar assessment. AMAP published a lengthy and user-friendly summary of its work in 1997, followed by a comprehensive compendium of the science in 1998. Canada's CACAR and AMAP's 1997 and 1998 reports were highly complementary. AMAP concluded:

> *The AMAP countries, all being parties to the Convention on Long-range Transboundary Air Pollution (CLRTAP) should work vigorously for the expeditious completion of negotiations for the three protocols [including POPs] being prepared....These protocols should apply throughout the full extent of the geographic areas covered by the Convention...the AMAP countries should strongly support the international negotiating committee, to be established early in 1998 following a decision of the Governing Council of the United Nations Environment Programme (UNEP), to prepare an international, legally-binding global agreement on controls for twelve specified POPs.*

Representatives of ICC attended meetings of AMAP and assisted in crafting the following policy recommendations, which drew heavily upon NCP experience:

- improve use of Aboriginal knowledge in environmental research, including local participation and policy;
- establish a long-term communication program to provide public information about environmental contaminants, linked to AMAP, which gives access to sound and regularly updated information in understandable language; and

- integrate contaminant issues for different educational levels in order to raise general environmental and scientific literacy among Arctic residents, including Aboriginal Peoples.

In Alta, Norway, in 1997, ministers took to heart these recommendations and promised:

> *...to increase our efforts to promote international co-operation in order to address serious pollution risks reported by AMAP. We will draw the attention of the global community to the content of the AMAP reports in all relevant international fora, particularly at the forthcoming Special Session of the General Assembly, and we will make a determined effort to secure support for international action, which will reduce Arctic contamination.*

The scene was set for Arctic information and concerns to play a significant role in international POPs negotiations.

While recognizing the need for global action on transboundary contaminants, the AMAP assessment pointed out the need for action by Arctic states within the Arctic:

> *The Arctic countries should take all necessary steps to ensure that their domestic responsibilities and arrangements to reduce contaminant inputs to the Arctic region are fully implemented. If these responsibilities and arrangements are not addressed in an appropriate manner, the justification for recommending actions aimed at reducing transboundary contaminants with sources outside of the Arctic will be accordingly diminished.*

In September 1998, Arctic Council ministers responded to this recommendation by instructing Senior Arctic Affairs Officials to develop a plan to address pollution sources within the Arctic. The resulting Arctic Council Action Plan on Pollution (ACAP), approved by ministers at their meeting in Barrow, Alaska, in 2000 and currently being implemented, consists of an overall strategy to promote cooperation and an accompanying list of agreed-upon projects. In no small measure, the AMAP assessment gave birth to ACAP, although the gestation period was over two years.

In gauging the influence of the assessment, it seems appropriate to leave the final word to AMAP's chair between 1991 and 1997, who, when speaking on the international ramifications of the assessment, said:

1. The AEPS and Arctic Council provided a clear policy objective – the protection of the Arctic environment and the well-being of its Indigenous people in relation to POPs.
2. It provided a forum for cooperatively gathering a sound and compelling scientific case on the need for action.
3. It equipped our political leaders to make national policy decisions on the need for international action and then to seek such action, initially through their joint Ministerial Declarations and then through instructions to their negotiating delegations.
4. It enabled our delegations to operate upon a common foundation of the best science available.

The POPs Protocol to LRTAP

The LRTAP Convention, signed in 1979 and ratified in 1983, was designed to address sulphur emissions in western Europe and resulting acidification of Scandinavian lakes. The reconnaissance POPs research in northern Quebec and southern Baffin Island mentioned above was referred to the Convention's Working Group on Effects. The Convention's Executive Body subsequently included this issue on the working group's work plan. Sweden and Canada persuaded the Executive Body in 1990 to set up an Intergovernmental Task Force on POPs to meet under the Convention's Working Group on Technology.

In April 1994, the task force concluded that the weight of evidence "clearly indicates that action to address POPs is warranted now." The working groups prepared a draft POPs Protocol in late 1996. Five negotiating sessions involving the UNECE countries were held in Geneva in 1997 and 1998 to address heavy metals and POPs. A POPs protocol to LRTAP was signed in Aarhus, Denmark, in 1998 and came into effect in October 2003.

The Protocol addresses 11 pesticides, 2 industrial chemicals and 3 by-products/contaminants. It bans the production and use of aldrin, chlordane, chlordecone, dieldrin, endrin, hexabromobiphenyl, mirex and toxaphene. Others, including dichlorodiphenyltrichloroe thane (DDT), heptachlor, hexachlorobenzene (HCB) and PCBs, are scheduled for elimination at a later date. Severe use restrictions are placed on DDT, hexachlorocyclohexane (HCH, including lindane) and PCBs. Parties are required to reduce emissions of dioxins, furans, polycyclic aromatic hydrocarbons (PAHs) and HCB below 1990 levels, and specific limit values are defined for incineration of municipal, hazardous and medical waste. The importance of Arctic concerns, as a driver of the Protocol, is plain, for it is referenced in the preamble:

> *Acknowledging that Arctic ecosystems and especially its Indigenous people, who subsist on Arctic fish and mammals, are particularly at risk because of the biomagnification of persistent organic pollutants,...*

States are required to develop strategies and programs to implement obligations within six months of the Protocol entering into force. States are also required to exchange information on the production, use and release of POPs; to promote public information on POPs and alternatives; to encourage research on all aspects of POPs; and to report to the Executive Body on measures taken to implement the Protocol.

In relation to stockpiles and wastes, the Protocol requires sound destruction or disposal in conformity with regional or global regimes, such as the Basel Convention. While not specifying means to add new substances, the Protocol refers to Executive Body decision 1998/2, which outlines information requirements should a state wish to do so.

Meetings of the Executive Body continue as the implementation of the obligations of the LRTAP POPs Protocol advances. Of particular note, in 2003, the Executive Body supported the establishment of a POPs Task Force under the Convention, and in December 2004, the Executive Body supported the importance of high-quality observational data to determine the effectiveness of the protocols.

Clyde River community feast, Arctic Char and Caribou

The United Nations Environment Programme's (UNEP) Stockholm Convention on POPs

In 1995, UNEP's Governing Council invited the Intergovernmental Forum on Chemical Safety (IFCS) and other international bodies to assess 12 POPs – the "dirty dozen," as they were colloquially named – with the aim of making a case for global action.

Drawing upon LRTAP and AMAP sources, Iceland delivered a synthesis of POPs concerns and data at the Reykjavik preparatory meeting for the 1995 Washington conference to establish the Global Plan of Action for the Protection of the Marine Environment from Land-based Activities. This report stimulated the UNEP Governing Council to invite the Inter-Organization Programme on the Sound Management of Chemicals (IOMC) and the International Programme on Chemical Safety (IPCS) to assess the need for global action on the 12 named POPs. Arctic data featured prominently in this assessment, for the AMAP reports were now in the printing process, and earlier drafts had been broadly circulated. Immediate action was recommended. In 1997, the Governing Council requested its Executive Director to convene an Intergovernmental Negotiating Committee (INC) with a mandate to prepare an international legally binding instrument to address the identified POPs and to identify additional candidate

substances for future action. A favourable response led to the negotiations towards a global POPs Convention beginning in 1998. Following negotiations in Montreal, Nairobi, Geneva, Bonn and Johannesburg, the Convention was signed in Stockholm in May 2001 by 114 countries. It entered into force on May 17, 2004.

The Convention's first Article draws attention to the precautionary approach and states an objective: "to protect human health and the environment from POPs." In language similar to the LRTAP POPs Protocol, the Stockholm preamble acknowledges:

> *...Arctic ecosystems and Aboriginal communities are particularly at risk because of the biomagnification of persistent organic pollutants and that contamination of their traditional foods is a public health issue.*

Acknowledging that many countries have limited technical as well as financial capacity, the Convention establishes a Capacity Assistance Network (a suggestion submitted to the Canadian government in advance of INC 2 by the Canadian Arctic Indigenous Peoples Against POPs, or CAIPAP) to help countries implement the Convention by strengthening their regulatory, monitoring and enforcement procedures. The idea evolved into the $20 million Canada POPs Fund announced at INC 4 to support capacity building to reduce or eliminate releases of POPs from developing countries and countries with economies in transition. The World Bank administers the Canada POPs Fund, which also provides support for capacity-building initiatives undertaken by UNEP and other multilateral organizations (www.chem.unep.ch/CanadaPOPsFund/Default.htm).

Canadian Aboriginal Peoples and the international POPs agreements

The NCP put northern Aboriginal Peoples' organizations on a steep learning curve about POPs science. It soon became clear to them that this was an issue of great long-term import, raising questions of health and culture as well as environmental protection. It was also clear quite early in the NCP process that the only long-term solution was to turn off the POPs taps at source — initially a daunting prospect. At no stage were the Aboriginal Peoples' organizations prepared to advise against eating highly nutritious traditional/country food obtained through hunting and fishing — age-old practices that lay at the heart of what it means to be Aboriginal.

Throughout the 1990s, Inuit were represented in the NCP by the Inuit Tapirisat of Canada, now the Inuit Tapiriit Kanatami (www.itk.ca), and the ICC (www.inuitcircumpolar.com). The latter organization, with a mandate to represent Inuit internationally, was an official observer at meetings of the AEPS and a "permanent participant" in the eight-nation Arctic Council, which, in 1997, subsumed the AEPS. Inuit were well able to connect the domestic NCP with the evolving circumpolar work on the issue. In 2000, First Nations in the Northwest Territories and Yukon established the Arctic Athabascan Council (AAC) (www.arcticathabaskancouncil.com/) and the Gwich'in Council International (www.gwichin.org) to participate in the Arctic Council, enabling them also to connect the NCP with AMAP.

Having worked cooperatively in the NCP, northern Aboriginal Peoples organizations (Council for Yukon First Nations, Dene Nation, ICC and Inuit Tapiriit Kanatami) established in 1997 the coalition CAIPAP. With a mandate to encourage and press the Government of Canada to take an assertive position in the LRTAP negotiations then under way and the global POPs negotiations soon to start, CAIPAP participated in two LRTAP negotiations and all of the global POPs sessions.

The coalition called upon the involvement and interventions of their Aboriginal politicians keen to protect the health of their constituents. At the beginning of the global POPs process, the coalition defined a position from which it never wavered, seeking a comprehensive, verifiable and rigorously implemented convention. These principles were supported by the coalition's technical analyses that the Convention commit to POPs elimination rather than perpetual management and that generous funding and technical assistance be provided to developing countries and those with economies in transition to enable them to live up to obligations and duties in the Convention. As well, the Convention developed positions on destruction of stockpiles, import and export controls, and detailed other features of a "model" convention.

Faculty and graduate students of the Faculty of Law at the University of Calgary advised the coalition that verification provisions of arms control treaties might be usefully included in the global POPs Convention as a means of ensuring Convention implementation. At the request of CAIPAP, an Aboriginal woman from the western Arctic was included on Canada's delegation.

The coalition intervened at all negotiating sessions with telling effect. The first intervention at the Montreal session generated a round of applause by the more than 800 delegates — the only occasion in the more than two years of negotiations that this happened. The fact that Arctic Indigenous Peoples were "exotic" to most of the participating states and were listened to with curiosity added to the coalition's influence. A Chukchi medical doctor from Chukotka in the Far East of the Russian Federation and Vice-President of RAIPON joined the coalition in Nairobi, Bonn and Johannesburg, widening the coalition's geographical base, legitimacy and influence. She spoke convincingly of the POPs-related health concerns of 200 000 Indigenous people in the Russian Arctic.

The coalition linked long-range transport of POPs to the Arctic, which resulted in chronic health concerns of Aboriginal Peoples who eat traditional/country food, with acute health concerns of women, children and workers in tropical and temperate countries from fields being sprayed with offending pesticides and insecticides. This outreach proved very useful. At one stage, developing countries balked at the prospect of including DDT in the Convention. While banned in Canada for many years, DDT is used in tropical and temperate countries as a vector control for malaria, saving thousands of lives in the process. Just as the issue threatened to destabilize and/or polarize negotiations along north–south lines, the President of ICC Canada, speaking for the coalition, informed negotiators that Arctic Indigenous Peoples would refuse to be party to a convention that threatened the health of others. Such remarks helped to bridge the north–south divide.

Signed in Stockholm in May 2001, the global POPs Convention is now in force, and the first Conference of the Parties to the Convention took place in Uruguay in May 2005. Canada's Environment Minister recognized the important contribution of Canada's Inuit and other CAIPAP leaders to the success of the Convention, in a tribute immediately before the signing ceremony:

> *As you are aware, Canada is the first country to announce that it will both sign and ratify the UN Global Convention on Persistent Organic Pollutants in Stockholm on May 23. Canada's leading role in concluding this treaty reflected the strong engagement of Northern Aboriginal leaders such as yourselves, early Arctic Council work and the importance of the Northern dimension of our foreign policy. We will promote the early entry into force of the Convention in the lead up to and at the Johannesburg summit.*

Bibliography

Arctic Monitoring and Assessment Programme, *Arctic Pollution Issues: A State of the Arctic Environment Report*, Oslo, Norway, 1997.

Arctic Monitoring and Assessment Programme, *AMAP Assessment Report: Arctic Pollution Issues*, Oslo, Norway, 1998.

Arctic Monitoring and Assessment Programme, *AMAP Assessment 2002: Human Health in the Arctic*, Oslo, Norway, 2003.

Arctic Monitoring and Assessment Programme, *Persistent Toxic Substances, Food Security and Indigenous Peoples of the Russian North*, Oslo, Norway, 2004.

Bidelman, T.F., Macdonald, R.W. and Stow, J.P. (eds.), Sources, occurrence, trends and pathways of contaminants in the Arctic. *Science of the Total Environment* 2005; 342: 1–313.

Braune, B., Muir, D., DeMarch, B., Gamberg, M., Poole, K., Currie, R., Dodd, M., Dusckenko, W., Eamer, J., Elkin, B., Evans, M., Grundy, S., Hebert, C., Johnstone, R., Kidd, K., Koenig, B., Lockhart, L., Marshall, H., Reimer, K., Sanderson, J. and Shutt, L., Spatial and temporal trends of contaminants in Canadian Arctic freshwater and terrestrial ecosystems: a review. *Science of the Total Environment* 1999; 230: 145–207.

Downie, D.L. and Fenge, T. (eds.), *Northern Lights Against POPs; Combatting Toxic Threats in the Arctic*, McGill–Queen's University Press, Montreal and Kingston, 2003.

Indian and Northern Affairs Canada, *Canadian Arctic Contaminants Assessment Report*, Minister of Public Works and Government Services Canada, Ottawa, 1997.

Kuhnlein, H.V., Receveur, O., Muir, D.C.G., Chan, H.M. and Soueida, R., Arctic indigenous women consume greater than acceptable levels of organochlorines. *Journal of Nutrition* 1995; 125: 2501–2510.

Macdonald, R.W., Barrie, L.A., Bidleman, T.F., Diamond, M.L., Gregor, D.J., Semkin, R.G., Strachan, W.J., Li, Y.F., Wania, F., Alaee, M., Alexeeva, L.B., Backus, S.M., Bailey, R., Bewers, J.M., Gobeil, C., Halsall, C.J., Harner, T., Hoff, J.T., Jantunen, L.M.M., Lockhart, W.L., Mackay, D., Muir, D.C.G., Pudykiewicz, J., Reimer, K.J., Smith, J.N., Stern, G.A., Schroeder, W.H., Wagemann, R. and Yunker, M.B., Contaminants in the Canadian Arctic: 5 years of progress in understanding sources, occurrence and pathways. *Science of the Total Environment* 2000; 254: 93–234.

Muir, D.C.G., Born, E.W., Koczansky, K. and Stern, G.A., Temporal and spatial trends of persistent organochlorines in Greenland walrus (*Odobenus rosmarus rosmarus*). *Science of the Total Environment* 2000; 245: 73–86.

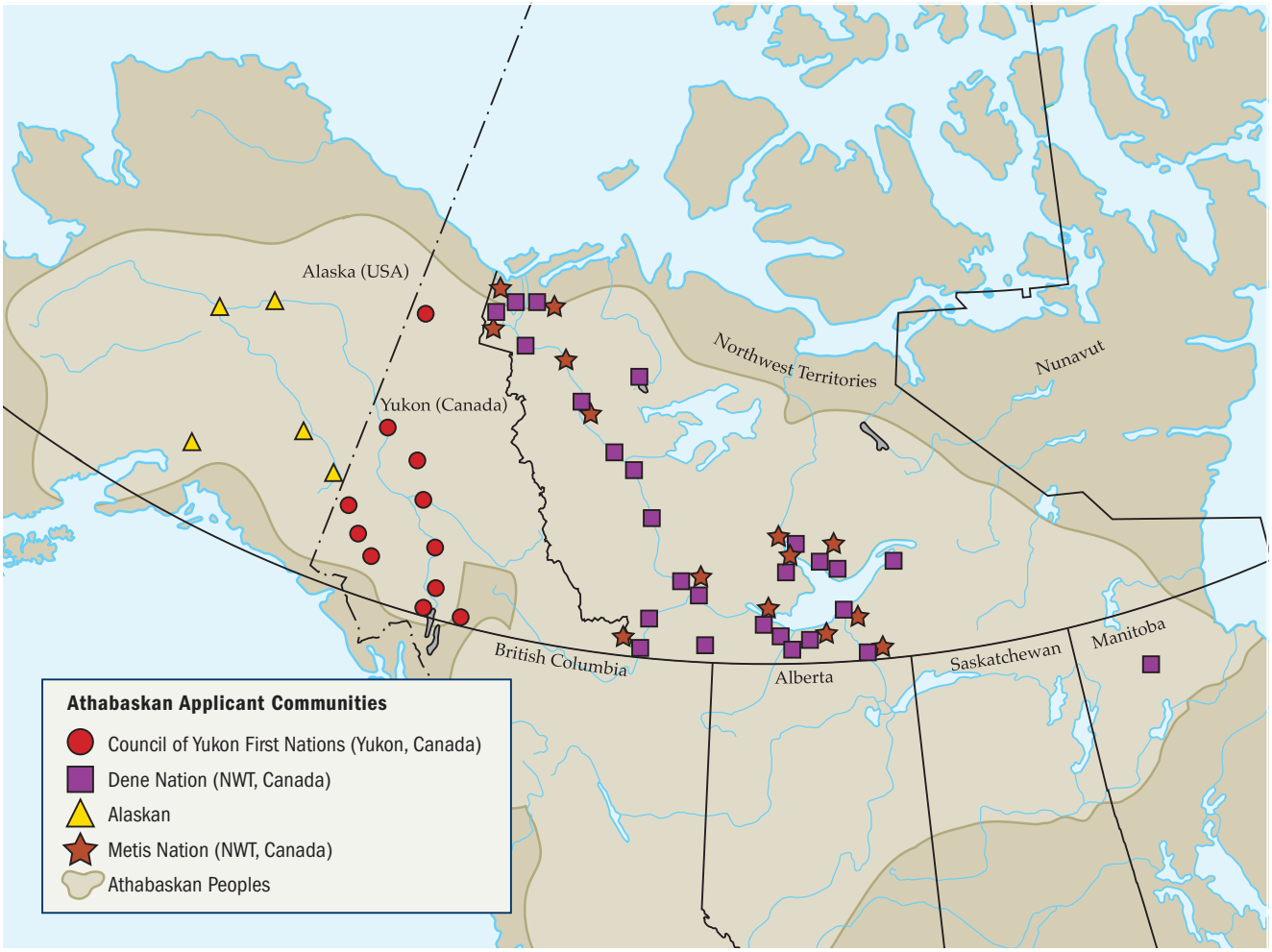
Muir, D., Braune, B., DeMarch, B., Norstrom, R., Wageman, R., Lockhart, L., Hargrave, B., Bright, D., Addison, R., Payne, J. and Reimer, K., Spatial and temporal trends and effects of contaminants in the Canadian Arctic marine ecosystem: a review. *Science of the Total Environment* 1999; 230: 83–144.

Muir, D., Shearer, R., Van Oostdam, J., Donaldson, S. and Furgal, C., Contaminants in Canadian Arctic biota and implications for human health. *Science of the Total Environment 2005*; 351–352; 1–3.

Northern Contaminants Program, *Canadian Arctic Contaminants Assessment Report II* (5 volumes), Minister of Public Works and Government Services Canada, Ottawa, 2003.

Van Oostdam, J., Gilman, A., Dewailly, E., Usher, P., Wheatley, B., Kuhnlein, H., Neve, S., Walker, J., Tracy, B., Feeley, M., Jerome, V. and Kwavnick, B., Human health implications of environmental contaminants in Arctic Canada: A review. *Science of the Total Environment* 1999; 230:1–82.

Figure A-2: Map of Athabaskan communities in northern Canada



Source: www.arcticathabaskancouncil.com/maps/index.php

Case study: Athabaskan contributions to the elimination/reduction of persistent organic pollutants

by Chris Paci, Cindy Dickson and Carole Mills, Arctic Athabaskan Council[88]

Introduction

By 1989, persistent organic pollutants (POPs), such as dichlorodiphenyltrichloroethane (DDT), lindane and polychlorinated biphenyls (PCBs), and heavy metals, such as mercury, were being reported in traditional foods in the Canadian North. As a result, Indigenous Peoples wanted to know what kinds of contaminants were in their traditional foods, where these were coming from, what the health implications were from continued exposure and what they could do to help "shut off the tap" on contaminants coming into the North. The federal government and scientists conducted research to explain to residents, as well as national and international observers, where contaminants were coming

[88] The authors are responsible for the information and opinions contained in this case study, which do not necessarily reflect the opinion of the Government of Canada.

from and the environmental health impacts these contaminants were having. The primary source for many of the POPs was from uses far removed from the North.

Athabaskans wanted to know what types of POPs and metals were in our environment and food chains. The research and explanation of these questions turned into a multistakeholder research program, the Northern Contaminants Program (NCP). Program results confirmed that the primary source for contaminants in the North was from the long-range transport of POPs into Denendeh (the Dene name for their traditional territories that form the bulk of the Northwest Territories) and the Yukon through air and water currents. POPs are naturally carried from areas where they are first used north to areas where they have never been used. As results were relayed and discussed, Indigenous Peoples were clear that the only viable solution for reducing our exposure to environmental contaminants was to put our efforts into removing the source of contaminants, not by limiting the consumption of traditional/country foods. This direction prompted Athabaskans to engage at the international and local levels in actions to reduce contaminant sources.

Athabaskans have extensive knowledge of the northern environment. Relative to southern Canadians, northern Indigenous Peoples are the most impacted peoples to be exposed to long-range contamination. The ongoing experience and participation of Athabaskans in international conventions continue to provide Canada with valuable contributions towards the elimination and reduction of POPs, controls reflected by the Stockholm Convention and the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (LRTAP) Protocols for POPs and Heavy Metals.

Contaminants from Athabaskan perspectives

Athabaskans understand the potential health risks posed by contaminants in the North, often expressing their views of health by way of their confidence in what the land provides to them. Both the general health of the Dene, Yukon First Nations and Metis and the specific health of families and individuals have been mirrored by the relative health of the land. When the land is healthy, so too are Indigenous Peoples. When the land is sick, no matter what is causing the sickness, this is felt by Indigenous Peoples in terms of spiritual, emotional and physical well-being. Our survival as Indigenous Peoples is dependent on a healthy northern environment (AMAP 2002:v). A lack of confidence in the safety of traditional foods contributes to the cultural degradation of Indigenous Peoples. Sickness of the land surfaces as a political issue that requires organizational representation.

Teaching the next generation about the land

© Council of Yukon First Nations

Northern Contaminants Program (NCP) and northern peoples

In the early 1990s, the NCP brought together a number of northern Aboriginal governmental organizations, federal and territorial government departments and academic institutions in search of scientific answers about contaminants in traditional/country foods. A unique partnership was formed, one that provided each partner with the capacity to make informed decisions about the relative risk and benefits of consuming traditional foods. Each partner in the NCP set its own organizational needs to focus on research and the proper communication of results to those most impacted by long-range contaminants.

Dene Nation became a key partner in the NCP, along with Council of Yukon First Nations, Metis Nation and Inuit organizations. For each of these Aboriginal governmental organizations, the NCP became the forum to encourage the reduction and, where possible, elimination of contaminants in traditional foods, while providing information to assist our members in making informed decisions about their food use.

The federal government has invested in the participation of Dene and other Indigenous Peoples in the management of the NCP, which has strengthened the program and contributed substantially to its success (Furgal et al. 2003:18). For example, Dene Nation sits on the NCP Management Committee and from 2001 to 2004 was co-chair of the Northwest Territories Environmental Contaminants Committee. The NCP enabled Dene and other Indigenous Peoples to establish a world-leading research laboratory at McGill University (Centre for Indigenous Nutrition and Environment).

The NCP recognized that any information Indigenous Peoples receive about contaminants in traditional/country foods could significantly affect our diets, economies and ways of life. Therefore, the program invested considerable time and resources into education, training, capacity building and communications. Several unique and institutional arrangements and models were conceived, such as territorial contaminants committees, regional contaminants coordinators, community tours, front-line training courses, school contaminants curriculum and so on.

The NCP has built the community capacity of northern Indigenous Peoples by developing technical capacity in the North (e.g., regional contaminants coordinators) and building bridges between traditional and scientific knowledge holders. For example, Dene Nation hosted three Elders' and Scientists' Retreats, produced videos on these meetings and developed a handbook on traditional knowledge in Denendeh. All research has been published in the academic press, to increase the value and knowledge of contaminant-related impacts in the North, and results have been disseminated to northern communities in all languages and in ways that Indigenous Peoples understand.

Curriculum specific to the North and contaminant issues has been developed for use in northern schools. In addition, Denendeh Contaminant Tours have been completed for the sole purpose of contaminants education and communication throughout Dene communities. Through the NCP, a network of trusted Aboriginal contacts has been formed in the North, which has facilitated a better understanding of the issues and has reduced misunderstandings of contaminants research and activities.

Dene Drummers

Photo by: T. Parker / © Northwest Territories Tourism

Contaminants research in Denendeh

In May 2000, media reported on a scientist's statements made at a conference in southern Canada, which focused on contaminant levels in Tutcho (Great Slave Lake), a primary food source for many Dene people. The statements were both inaccurate and alarmist. Alarmist messages can have considerable negative consequences on economically and culturally important traditional food systems (harvesting activities) and can have impacts on human nutrition and health (consumption) when fear leads to shifts away from traditional food use. The scientist was not working under the NCP and was not known by the communities that could be affected by the inaccurate statements. Rather than becoming anxious and believing the media reports, communities knew to immediately contact Dene Nation and other trusted contacts for clarification. This was possible because

of the trusted network built by the NCP and because of a good understanding of the state of knowledge of contaminants facilitated by the NCP. Without the trust and knowledge, federal governments would have expended a great deal of energy denying those results and may not ultimately have been believed.

Canadian Arctic Contaminants Assessment Reports

The findings of the first five years of NCP-sponsored research were published in 1997 (Jensen et al. 1997) as the first *Canadian Arctic Contaminants Assessment Report* (CACAR). This report provided a good idea of the contaminants coming to the Northwest Territories from elsewhere, acknowledging which heavy metals, POPs and radionuclides were found in traditional foods. In 2003, the second assessment, CACAR II, was published (Furgal et al. 2003), providing greater insight on the state of environmental health. The second report provided a more accessible continuation of this work. NCP research has enabled the Council of Yukon First Nations and Dene Nation to conclude that long-range contaminants are having minimal effects on the quality of traditional foods. Therefore, an important finding resulting from NCP research is that "traditional Athabaskan foods are healthy," with relatively low levels of contaminants and high nutritional value. Health risk and benefit assessment has been advanced a great deal by the work of the NCP. Risk management for Denendeh, for example, would rank exposure to long-range contaminants in traditional foods as low. A note of caution to this announcement is that cumulative impacts and mixtures of contaminants, as well as new and emerging contaminants and local point source contamination (e.g., from historical mining in Denedeh), are not included in the risk designation of the NCP. Traditional Athabaskan foods are healthy, except in the cases where health consumption advisories have been issued.

Arctic Monitoring and Assessment Programme

The Arctic Monitoring and Assessment Programme (AMAP) of the Arctic Council has released two major assessments on northern contaminants (AMAP 1997, 1998, 2002, 2003), and the next report is expected in 2012. These assessments rely on domestic data, which Canada provides through the NCP. Indigenous Peoples participate directly in AMAP as well as sitting on the Arctic Council. Canada provides AMAP with relevant research priorities, successful communication models and accurate contaminants information.

Indigenous expertise in assessments

The value of Indigenous participation in this work can be demonstrated with a recent example from the second AMAP assessment report (2002). In the summary report, it was inaccurately shown that cesium-137 was extremely high in caribou for a northern Canadian community — so high, in fact, that it had to be wrong (AMAP 2002:76). Such reporting could have had negative impacts on the residents of that community who depend extensively on caribou. It was pointed out at the AMAP Symposium by technical staff of the Gwich'in Council International and Arctic Athabaskan Council (AAC) that the report was in error. The point was reinforced at the Inari Ministerial Meeting (2002) and corrected before it could be inaccurately communicated further.

International engagement of Arctic Indigenous leaders

It became clear through successive research studies that the primary source of contaminants to the North was from industrial and agricultural activities in other parts of the world. Long-range transport of contaminants affected all aspects of the health of Indigenous Peoples. It was realized that a great effort was needed to end the flow of contaminants north. We needed to address the issue together at the international level. It was noted that not all Arctic Indigenous Peoples were represented by the three accredited United Nations bodies: Saami Council, Russian Association of Indigenous Peoples of the North (RAIPON) and Inuit Circumpolar Conference. To address this, the Dene Nation hosted the first meeting of Arctic Indigenous leaders from the Northwest Territories, Yukon, Alaska and Russia, including peoples not accredited by the United Nations in 1996. This meeting helped inform the Arctic Council member states on the necessity of recognizing all Aboriginal Peoples as Permanent Participants to

the Council. The Dene Nation, the Council of Yukon First Nations and Metis Nation entered into an international treaty to create the Arctic Athabaskan Council (AAC). Since the initial meeting, three permanent participants, including AAC, have been added to the existing three. Athabaskans continue to play an important role in the Arctic Council, contributing the *Arctic Climate Impact Assessment* (ACIA 2005) and the *Arctic Human Development Report* (AHDR 2004).

The institutional linkages of AAC provide us with the ability to meaningfully monitor and help implement the elimination of circumpolar pollution. Arctic Council projects offer us insight on how we are able to work on this important issue and attract additional resources. The institutional capacity of AAC to participate in the Stockholm Convention and protocols on heavy metals and POPs depends on resources.

Northern Ecosystem Initiative (NEI)

Although significant progress was made at eliminating the sources of contaminants from other parts of the world, Elders told us that there were still problems with the land. We knew that problems with the land were not coming solely from other parts of the world; local point sources were also contributing to local environments. We turned to Canada's Northern Ecosystem Initiative (NEI) in our concern to understand the contributions of climate change to contaminants and the health of northern ecosystems. Government policies and programs in northern Canada were disconnected when it came to climate change issues. In 2002, Dene Nation secured funds for the first Denendeh Environmental Working Group workshops and, at the end of 2002, joined the National Steering Committee under a Partnership Agreement. Council of Yukon First Nations joined the Steering Committee shortly thereafter. Athabaskans have actively lobbied at the Contaminants Partner-Issue table for local contaminant concern funding to better understand the issues related to local contaminants impacting ecosystem health. Dene Nation, Council of Yukon First Nations and Inuit Tapiriit Kanatami sit at the NEI National Steering Committee; in addition, all three are active members of the Contaminants Partner-Issue table.

Boy with mask at celebration

Photo by: W. Towriss © Government of Yukon

Canadian Environmental Protection Act, 1999 (CEPA 1999)

The *Canadian Environmental Protection Act, 1999* (CEPA 1999) is a primary federal tool for Canada to implement the Stockholm Convention. The Act limits or curtails the production (including unintentionally produced POPs, or UPOPs) and use of the dirty dozen POPs listed in the Stockholm Convention. The National Pollutant Release Inventory (NPRI) is managed under CEPA 1999. The legislation is to be reviewed every five years. The year 2005 marks the first five-year anniversary of the Act and ushers in the Parliamentary review process. An important feature of CEPA 1999 is the involvement of a National Advisory Committee, an intergovernmental forum that includes up to six representatives of Aboriginal governments. Furthermore, CEPA 1999 regulates more toxic substances than the 12 POPs listed in the Stockholm Convention. The Assembly of First Nations organized a regional First Nations meeting to hear from member organizations, including Dene Nation, in developing a briefing for the Ministers of Environment and of Health, the two ministers responsible for CEPA 1999. Representatives of Environment Canada and Health Canada also have travelled through Canada for "stakeholder" consultations. Dene Nation attended the Yellowknife meeting, and we subsequently attended a meeting hosted by Environment Canada in Ottawa on the National Implementation Plan (NIP). The substance of Athabaskan views is contained in this case study.

Arctic Climate Impact Assessment

Because of our close ties to the land, Arctic Indigenous Peoples have provided the first indications of changing climate and biodiversity. Changes in climate have a direct relationship to the release of contaminants in the Arctic, as heating and cooling will add to the levels of contaminants already in the environment. In the case of metals such as mercury, increased thawing of permafrost is thought to increase the potential release of contaminants in water and fish. The Arctic Climate Impact Assessment (ACIA) began in 2000; while it originated in AMAP, it also involves the International Arctic Science Committee and Conservation of Arctic Flora and Fauna. The level of engagement of Athabaskans and all northern Indigenous Peoples has been very significant. The ACIA Symposium, held in November 2004, saw presentations from key Indigenous leaders and collaborative scientific research. Key results were released in a synthesis report in 2004, with the scientific report published in 2005.

Stockholm Convention

The impact that Indigenous Peoples can have on international initiatives is evidenced in our participation in the negotiations of the Stockholm Convention on POPs. The rapid and successful completion of the negotiations was due in part to Indigenous Peoples' contributions to the development of Canada's positions and driven by the unexpected high levels of contaminants found in Arctic Indigenous Peoples. We were able to keep our cultural health as a focus for the discussions.

International lobby

Dene Nation, Council of Yukon First Nations and Inuit organizations played a very important role in the chain of events leading to the Stockholm Convention. In 1993, Athabaskan leadership supported a study to look at the levels of contaminants in the umbilical cord blood of people who consume traditional foods. Dene Nation and regional Inuit organizations developed a culturally sensitive recruitment protocol and information materials, contributed to study design and assisted in the dissemination of results. The studies received a very high participation rate, and the recruitment protocol has been adopted by other regions and countries. The results from the studies showed levels of contaminants in traditional food users, elevated enough, in enough people, to warrant immediate international attention. Discussions began at the UNECE and soon progressed to UNEP, resulting in the Stockholm Convention, ratified in 2004. This is a prime example of how Indigenous partnerships helped negotiate an international treaty to protect the global environment.

Canada's NIP/National Action Plan (NAP) for the Stockholm Convention is the most recent stage in developing a collective response to the problems of long-range transport of contaminants. The NIP includes consultations with key partners and stakeholders and the development of a NAP. Indigenous Peoples can contribute by providing an effective communications network, identifying new concerns and partnering in the monitoring of contaminants. The success of the NIP/NAP will depend on the continued building of partnerships between Canada and Indigenous Peoples. The global implementation of the Convention starts in the North and will require our work internationally in a coordinated and effective way. Like the NCP before it, the NIP/NAP requires key investments and creative partnerships.

Conclusions

The resources required to work on international initiatives such as ACIA and AMAP take advantage of various synergies, including domestic programs set up by the federal government, such as the NCP and NEI. Being connected through various institutions is important, and equally important is the capacity that is enhanced by each project activity. Having well-trained and capable staff, educated and aware leadership and connected networks of researchers and scientists is essential for capacity building, to enable northerners to increase their ability to deal with complex environmental problems. Such was the case when Elders and scientists first voiced their concerns that traditional foods were contaminated. We have enough experience and knowledge to say that in Denendeh our traditional foods are healthy, but we must remain vigilant to ensure that they stay healthy.

Canada's current and past actions allow it to meet the requirements of the Stockholm Convention. However, Canada also needs to continue to lead the world in the reduction and elimination of contaminants by building on the successful engagement of Indigenous Peoples in the implementation of the Stockholm Convention. We know that our involvement in the NAP will be of critical importance to Canada.

The connection of circumpolar environments at the policy level is crucial. We have learned invaluable lessons from the UNECE LRTAP protocols (Heavy Metals and POPs) and the Stockholm Convention. The work at the international level illustrates a real need for and benefit to putting northern Indigenous Peoples face to face with policy- and decision-makers. Furthermore, this work is supported by extensive work at the domestic, regional and community levels. It is important to ensure that the channels of communication are open, with information flowing both ways. When Athabaskans are engaged in discussions of impacts on their environment, there is an opportunity to demonstrate connections we share, despite great geographic distances.

References

ACIA (2005). *Arctic Climate Impact Assessment*. Cambridge University Press. www.acia.uaf.edu

AHDR (2004). *Arctic Human Development Report*. Stefansson Arctic Institute, Akureyri, Iceland. www.svs.is/AHDR/AHDR%20chapters/Chapters%20PDF.htm

AMAP (1997). *Arctic Pollution Issues: A State of the Arctic Environment Report*. Arctic Monitoring and Assessment Programme, Oslo, Norway.

AMAP (1998). *AMAP Assessment Report: Arctic Pollution Issues*. Arctic Monitoring and Assessment Programme, Oslo, Norway.

AMAP (2002). *AMAP Arctic Pollution 2002*. Arctic Monitoring and Assessment Programme, Oslo, Norway.

AMAP (2003). *AMAP Assessment 2002: Human Health in the Arctic*. Arctic Monitoring and Assessment Programme, Oslo, Norway.

Damstra, T. et al. (eds.) (2002). *Global Assessment of the State-of-the-Science of Endocrine Disruptors*. World Health Organization, Geneva, Switzerland.

Dene Nation (n.d., ca. 1997). "Strengthening the Ties in Denendeh." Video (38 min).

Dene Nation (n.d., ca. 1998). "Strengthening the Ties in Denendeh 2." Video (34 min).

Indian and Northern Affairs Canada (2003). *Highlights of the Canadian Arctic Contaminants Assessment Report II*. Ottawa. www.ainc-inac.gc.ca/ncp/pub/pdf/hig/hil_e.pdf

Indian and Northern Affairs Canada (2003). *Knowledge in Action. Canadian Arctic Contaminants Assessment Report II*. Ottawa. www.ainc-inac.gc.ca/ncp/pub/pdf/kno/kno_e.pdf

Jensen, J., Adare, K. and Shearer, R. (eds.) (1997). *Canadian Arctic Contaminants Assessment Report (CACAR).* Public Works, Ottawa.

Johansson, G., Paci, C., Stenersen, S., Fedorova, C. and Keskitalo, J.H. (2004). Education. In: *Arctic Human Development Report*. Stefansson Arctic Institute, Akureyri, Iceland, pp. 169–186.

Paci, C. (2003). Northern Contaminants Program in the NWT. *EPINorth* 15(4):1, 15.

Paci, C., Dickson, C., Nickels, S., Chan, L. and Furgal, C. (2004). *Food Security of Northern Indigenous Peopls in a Time of Uncertainty*. A position paper presented for the 3rd Northern Research Forum Open Meeting in Yellowknife and Rae Edzo, September 15–18, 2004.

Paci, C., Dickson, C., Nickels, S., Chan, L. and Furgal, C. (2005). Climate change and human health, a Canadian example of traditional/country food security research. In: L. Hinenen et al. (eds.), *The Resilient North: Human Responses to Global Change*.

Tyson, M. (1999). *TK for Dummies*. Dene Nation, Yellowknife, Northwest Territories.

APPENDIX B
Summary of National Actions

Prince Edward Island village

© Canadian Tourism Commission

Federal, provincial and territorial governments all play a role in meeting the obligations under the Stockholm Convention. These actions include the use of:

- joint federal/provincial/territorial actions under the Canadian Council of Ministers of the Environment (CCME);
- federal–provincial agreements;
- federal instruments; and
- provincial and territorial instruments.

a) Joint federal/provincial/territorial actions under the CCME

The CCME is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national and international concern. CCME works to promote effective intergovernmental cooperation and coordinated approaches to interjurisdictional issues such as air pollution and toxic chemicals. CCME members collectively establish nationally consistent environmental standards, strategies and objectives so as to achieve a high level of environmental quality across the country.

Specific subagreements under the CCME that pertain to persistent organic pollutants (POPs) include:

- the Comprehensive Air Quality Management Framework for Canada;
- the Canada-wide Accord on Environmental Harmonization, including the Canada-wide Standards on Dioxins and Furans;

  The Province of Quebec has not signed the Canada-wide Accord on Environmental Harmonization; however, it works to achieve consistency with the CCME approach to environmental issues.
- the CCME Policy for the Management of Toxic Substances;
- the National Commitment to Pollution Prevention; and
- Cooperation on Environmentally Sound Waste Management.

Guidelines related to POPs have been developed under the CCME and include:

- CCME Guidelines for the Management of Wastes Containing PCBs (1989);
- CCME Guidelines for Mobile PCB Destruction Systems (1990);
- CCME Guidelines for Mobile PCB Treatment Systems (1990);
- CCME National Guidelines for the Landfilling of Hazardous Wastes (1991);
- CCME National Emission Guidelines for Stationary Combustion Turbines (1992);
- CCME National Guidelines for Hazardous Waste Incineration Facilities, Design and Operating Criteria, Volumes 1 and 2 (1992);
- CCME National Guidelines for the Use of Hazardous and Non-hazardous Wastes as Supplementary Fuels in Cement Kilns (1996);
- Wood Preservation Facilities: Recommendations for the Design and Operation of Creosote, Pentachlorophenol, Chromated Copper Arsenate and Pentachlorophenol Thermal Facilities (1998); and
- National Guidelines for Hazardous Waste Incineration Facilities: Design and Operating Criteria.

Additional information on national actions related to POPs can be found at the CCME website (www.ccme.ca).

b) Federal–provincial agreements

Under the *Canadian Environmental Protection Act, 1999* (CEPA 1999), federal and provincial/territorial governments can enter into agreements on environmental instruments related to inspections, enforcement, monitoring, reporting, etc. Current agreements include:

- the Canada–Saskatchewan Administrative Agreement concerning CEPA 1999 regulations, including those related to pulp and paper mills and PCBs;
- the Canada–Quebec Administrative Agreement concerning the pulp and paper sector; and
- the Canada–Alberta Equivalency Agreement to eliminate duplication related to dioxin, furan and vinyl chloride emissions.

Additional information on these agreements can be found on the CEPA Environmental Registry (www.ec.gc.ca/CEPARegistry/agreements).

c) Federal instruments

Federal instruments allow for the management of POPs and include legislation and regulations, policies and programs, guidelines and plans.

The Toxic Substances Management Policy (TSMP), adopted in June 1995, provides for the preventive, precautionary management of toxic substances to ensure the protection of human health and the environment. It guides federal actions domestically and serves as the centrepiece for the Canadian position in international negotiations on managing toxic substances. The policy recognizes the particular problems associated with toxic substances that are in the environment as a result of human activity, that persist in the environment and that accumulate in organisms. These "Track 1" substances are targeted for virtual elimination from the environment. The policy can be found at www.ec.gc.ca/toxics/TSMP/en/execsum.cfm.

The Pest Management Regulatory Agency's Strategy for Implementing the Toxic Substances Management Policy (DIR-99-03) outlines the approach taken under the *Pest Control Products Act* (PCPA) for dealing with Track 1 substances in pest control products. POPs that were listed under the Stockholm Convention at its coming into force are managed by Environment Canada under the TSMP. CEPA 1999 instruments are used to achieve the Convention's objectives, and the legislation's provisions incorporate the intent and criteria of the TSMP regarding toxics assessment and management.

Legislation and regulations related to substances under the Convention include CEPA 1999 and the PCPA. Information about CEPA 1999 can be found at www.ec.gc.ca/ceparegistry; information on the PCPA is available at www.hc-sc.gc.ca/pmra-arla.

More specifically, federal instruments as they relate to the Stockholm Convention include the following:

Intentionally produced POPs

- CEPA 1999
  - List of Toxic Substances (Schedule 1 of the Act)
  - Export Control List (Schedule 3 of the Act)
  - Interprovincial Movement of Hazardous Waste Regulations
  - Prohibition of Certain Toxic Substances Regulations, 2005
  - Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations
  - Export of Substances Under the Rotterdam Convention Regulations
  - Chlorobiphenyls Regulations
  - New Substances Notification Regulations
  - Persistence and Bioaccumulation Regulations
  - Guidelines and codes of practice
- PCPA
- Government of Canada TSMP
  - Track 1 (virtual elimination)

Unintentionally produced POPs

- CEPA 1999
  - List of Toxic Substances (Schedule 1)
  - Export Control List (Schedule 3)
  - Prohibition of Certain Toxic Substances Regulations, 2005
  - Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations
  - Export of Substances Under the Rotterdam Convention Regulations
  - Chlorobiphenyls Regulations
  - Persistence and Bioaccumulation Regulations
  - Pulp and Paper Mill Defoamer and Wood Chip Regulations
  - Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations
  - Pollution prevention and virtual elimination planning provisions
  - Guidelines and codes of practice
- PCPA
- *Fisheries Act*
  - Pulp and Paper Effluent Regulations

Stockpiles and wastes

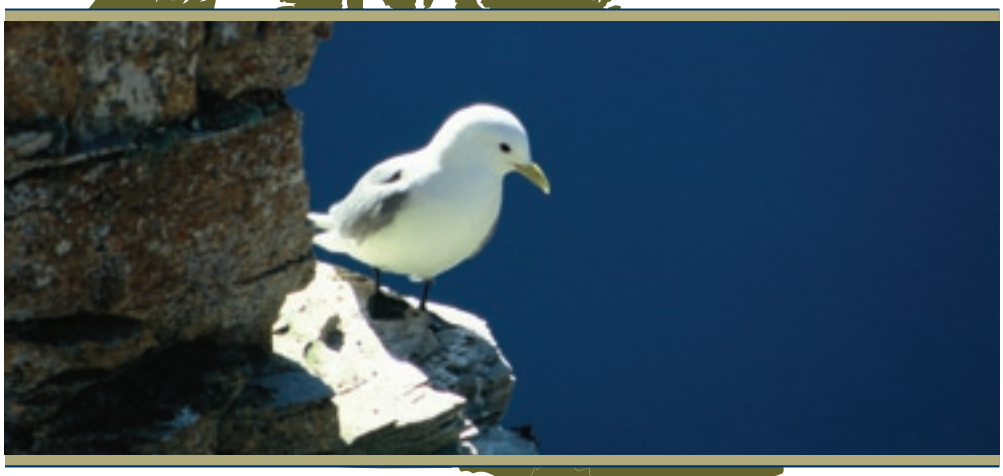
- CEPA 1999
  - Interprovincial Movement of Hazardous Waste Regulations
  - Disposal at Sea Regulations
  - Federal Mobile PCB Treatment and Destruction Regulations
  - PCB Waste Export Regulations, 1996
  - Storage of PCB Material Regulations

Monitoring and reporting tools

- National Air Pollution Surveillance (NAPS) Network
- Northern Contaminants Program (NCP)
- National Pollutant Release Inventory (NPRI)
- National Inventory of PCBs in Use and PCB Wastes in Storage in Canada
- National Inventory of PCDD/PCDF Releases
- Residual Discharge Information System

d) Provincial/territorial instruments

All provinces and territories have legislation and regulations to manage air quality, toxic substances and pesticides. Table 2-1 provides a detailed list. Most provinces and territories have an Environmental Protection Act, or the equivalent, with regulations that establish permitting or approvals systems for stationary point sources that discharge pollutants to the atmosphere. Most provinces and territories also have a Pesticides Act or regulations that establish a system for managing pesticide use. Two provinces have a Clean Air Act.



PART - II

CANADA'S NATIONAL ACTION PLAN ON UNINTENTIONALLY PRODUCED PERSISTENT ORGANIC POLLUTANTS (NAP)

Black-legged kittiwake

TABLE OF CONTENTS: PART II

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Colours of autumn, Lesage Quebec

Under the Stockholm Convention on Persistent Organic Pollutants (POPs), Parties are to develop and endeavour to implement an action plan taking into account the obligations set out under Article 5 of the Convention — namely, measures to reduce or eliminate releases from unintentional production of POPs.

The Convention has defined four POPs to be reduced and ultimately eliminated from anthropogenic sources in which these substances are unintentionally formed and released:

- polychlorinated dibenzo-*p*-dioxins (PCDDs, also referred to as dioxins);
- polychlorinated dibenzofurans (PCDFs, also referred to as furans);
- hexachlorobenzene (HCB); and
- polychlorinated biphenyls (PCBs).

Part II of this report, Canada's National Action Plan (NAP) on Unintentionally Produced Persistent Organic Pollutants (UPOPs), forms part of Canada's National Implementation Plan (NIP) for POPs.

As a first report, the NAP presents information on releases of UPOPs, laws and policies and strategies that Canada has adopted in its domestic programs to reduce and virtually eliminate UPOPs. In Canada, protection of the environment is a responsibility shared by all levels of government. Canadian programs in science and technology and actions on UPOPs have focused mostly on dioxins and furans, as the most information regarding formation, releases, prevention and control is available for these substances. Current actions focus on reducing releases from priority sources as a step towards the goal of ultimate elimination, while continuing to gather information on other less well defined sources.

The objective of Part II of this document is to review Canada's plans for meeting the specific obligations outlined under Article 5 of the Convention.

Ocean surf, Newfoundland

2. BACKGROUND

Mount Logan, Kluane National Park, Yukon

Photo by: ICN-RCI / Hemera © Statistics Canada, 2003

Under Article 5 of the Stockholm Convention, Parties are required to take certain measures, as summarized in Figure 2-1, to reduce total releases of by-product emissions of Annex C chemicals from anthropogenic sources "with the goal of their continuing minimization and, where feasible, ultimate elimination."

Under Article 5 (a), the Convention provides further guidance on the content of an action plan:

Note: Text that appears in blue shading (except that in square brackets) directly quotes the Convention text.

(i) An evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates, taking into consideration the source categories identified in Annex C;
(ii) An evaluation of the efficacy of the laws and policies of the Party relating to the management of such releases;
(iii) Strategies to meet the obligations of this paragraph [measures to reduce or eliminate releases from unintentional production], taking into account the evaluations in (i) and (ii);
(iv) Steps to promote education and training with regard to, and awareness of, those strategies;
(v) A review every five years of those strategies and of their success in meeting the obligations of this paragraph [measures to reduce or eliminate releases from unintentional production]; such reviews shall be included in reports submitted pursuant to Article 15; and
(vi) A schedule for implementation of the action plan, including for the strategies and measures identified therein;

Annex C of the Stockholm Convention lists 17 sectors or categories that are identified as sources of the four UPOPs. These have been listed below for reference:

Part II: Source categories

Polychlorinated dibenzo-p-dioxins and dibenzofurans, hexachlorobenzene and polychlorinated biphenyls are unintentionally formed and released from thermal processes involving organic matter and chlorine as a result of incomplete combustion or chemical reactions. The following industrial source categories have the potential for comparatively high formation and release of these chemicals to the environment:

(a) Waste incinerators, including co-incinerators of municipal, hazardous or medical waste or of sewage sludge;
(b) Cement kilns firing hazardous waste;
(c) Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching;
(d) The following thermal processes in the metallurgical industry:
    (i) Secondary copper production;
    (ii) Sinter plants in the iron and steel industry;
    (iii) Secondary aluminium production;
    (iv) Secondary zinc production.

Part III: Source categories

Polychlorinated dibenzo-p-dioxins and dibenzofurans, hexachlorobenzene and polychlorinated biphenyls may also be unintentionally formed and released from the following source categories, including:

(a) Open burning of waste, including burning of landfill sites;
(b) Thermal processes in the metallurgical industry not mentioned in Part II;
(c) Residential combustion sources;
(d) Fossil fuel-fired utility and industrial boilers;
(e) Firing installations for wood and other biomass fuels;
(f) Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially production of chlorophenols and chloranil;
(g) Crematoria;
(h) Motor vehicles, particularly those burning leaded gasoline;
(i) Destruction of animal carcasses;
(j) Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction);
(k) Shredder plants for the treatment of end of life vehicles;
(l) Smouldering of copper cables;
(m) Waste oil refineries.

Rock formations known as Hoodoos, Drumheller, Alberta

Figure 2-1: Schematic summarizing obligations of Article 5 of the Stockholm Convention on POPs

Summary* of Measures for Unintentionally produced Persistent Organic Pollutants (UPOPs: PCDD/F, HCB, PCBs)

- Develop **Action Plan** with implementation schedule, 2 years after entry into force for Party.
- **Inventory** current and projected releases.
- **Evaluate** laws and policies.
- **Develop and promote** strategies and review every 5 years.
- **Require BAT**** for new sources identified in Plan and **Part II Annex C** 4 years after entry into force for Party.
- **Promote BAT** for existing sources **Part II** and **Part III**, **Annex C**, and for new sources **Part III**, **Annex C**.
- **Promote BEP***** for new and existing sources **Part II** and **Part III**, **Annex C**.

Source Categories — Part II
Annex C
Require BAT for new sources
Promote BEP

- **Incinerators** (municipal, hazardous, medical, sewage sludge)
- **Cement kilns - hazardous wastes**
- **Pulp production using elemental chlorine**
- **Thermal metallurgical processes** (iron sintering, secondary copper, aluminum and zinc)

Source Categories — Part III
Annex C
Promote BAT/BEP for new and existing sources

- **Open burning of waste, residential burning**
- **Wood, other biomass firing**
- **Fossil fuel-fired utility, industrial boilers**
- **"Other" thermal metallurgical processes** (secondary lead, secondary steel, primary aluminum, primary base metals (i.e. copper, lead, nickel, zinc), magnesium)
- **Smouldering copper cables**
- **Specific chemical processes** (chlorophenols, chloranil), textile and leather dyeing and finishing
- **Crematoria, destruction of animal carcasses**
- **Motor vehicles, waste oil refineries, vehicle shredder plants**

* See Convention legal text for definitive details

** **Best Available Techniques (BAT)**: most effective and advanced activities to limit, prevent or reduce releases (process description, available techniques, and achievable release levels).

*** **Best Environmental Practices (BEP)**: environmental control measures and strategies

3. RELEASES OF UNINTENTIONALLY PRODUCED POPS IN CANADA

Stelco iron sintering plant, Hamilton, Ontario

Photo by: L. Lukasik

3.1 Current releases and trends

3.1.1 *National release inventory of PCDDs/PCDFs for point, area and mobile sources*

Estimates of national releases to air, water and soil from point, area and mobile sources have been developed for calendar years 1990, 1997 and 1999 using best available information. A data report, *Inventory of Releases: PCDD/PCDF,* was first published by Environment Canada in 1999 and subsequently updated in 2001 with revisions to the earlier 1999 estimates.[1] These estimates have provided the basis for selecting reduction strategies undertaken through the Canada-wide Standards (CWS) process for dioxins and furans, an interjurisdictional initiative of federal, provincial and territorial governments through the Canadian Council of Ministers of the Environment (CCME). Information on sectoral releases is presented in Appendix A.

Release estimates for 1999 indicated that seven top-ranking sources, varying from regional to national in scope, accounted for about 82% of the estimated total 164 g of dioxins/furans released to air from anthropogenic sources, expressed in international toxic equivalence units (ITEQ). As a result of recent studies, reports with current estimates of dioxins/furans for open burning of municipal solid waste[2] and for on-site residential waste combustion[3] became available subsequent to the compilation of the *Inventory of Releases: PCDD/PCDF*. These releases were estimated at 13–23 g ITEQ and 20–40 g ITEQ to the atmosphere per year for open burning of waste and on-site residential waste combustion, respectively.

Values expressed in ITEQ are calculated using a system of factors (TEF or toxic equivalence factors) that relate the order of magnitude toxicity of the 17 specific dioxin and furan compounds considered significantly toxic to the most toxic compound, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2378-TCDD). The factors used in calculating ITEQ were established by the Committee on the Challenges of Modern Society (CCMS) of the North Atlantic Treaty Organization (NATO) in 1988 (NATO/CCMS, *Method of Risk Assessment for Complex Mixtures of Dioxins and Related Compounds*, Technical Report No. 176, 1988). Other internationally recognized toxic equivalence systems exist, most notably the more recent scheme developed in 1997 by the World Health Organization (WHO), which includes consideration of specific co-planar PCBs that have structures similar to that of 2378-TCDD. Since historic environmental and emissions data used to establish baseline conditions predate the WHO system, the NATO/CCMS system is used in this document.

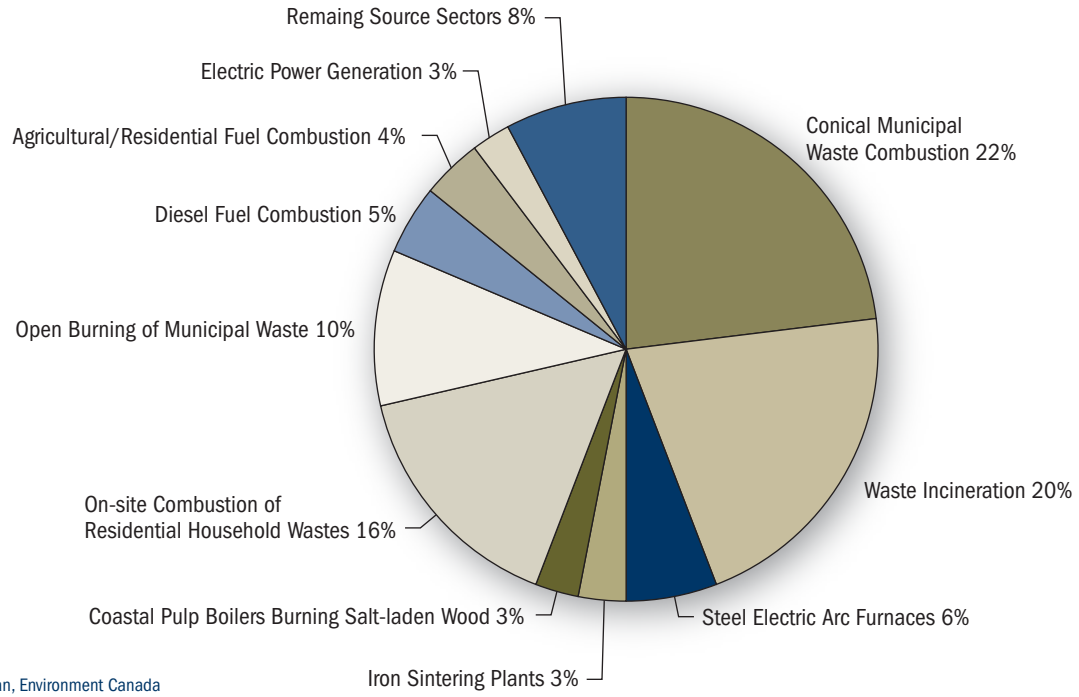
The percent contributions of identified source sectors releasing dioxins and furans are summarized in Figure 3-1. The data presented here take into account both the 1999 release estimates and the updated understanding of releases from open burning of waste and on-site residential waste combustion noted above.

[1] Environment Canada, *Inventory of Releases: PCDD/PCDF – Updated Edition*, February 2001.

[2] Earth Tech Canada Inc., *Dioxins and Furans Emissions from Open Burning of Municipal Solid Waste in Canada at Landfill Facilities, Final Report*, prepared for the Canadian Council of Ministers of the Environment, March 2004.

[3] Gartner Lee Limited, *Dioxin/Furan Emissions from On-Site Residential Waste Combustion*, prepared for the Canadian Council of Ministers of the Environment, February 2003.

Figure 3-1: Estimated percent contribution of sector dioxin and furan releases to the atmosphere in 1999



Source: Sarah Ternan, Environment Canada

The estimates of releases are expected to be dynamic, as additional source characterization studies provide new or updated information.

The actions taken for the source categories that have been better characterized during the past decade demonstrate significant progress, as shown by the data tabulated in Table 3-1. On a national basis, annual releases in 1999 of dioxins/furans to air and water were reduced by approximately 62% and 99%, respectively, from 1990 levels. Releases to soil have remained unchanged, at about 19 g ITEQ.

Table 3-1: Dioxin/furan release trends from 1990 to 1999

Media	Release (g ITEQ)			Percent change, 1990–1999
	1990	1997	1999	
Air	427	274	164	62% decrease
Water	454	3	3	99% decrease
Soil	19	19	19	No change

Source: Environment Canada, *Inventory of Releases: PCDD/PCDF*, 2001

3.1.2 National Pollutant Release Inventory

In 1992, Environment Canada expanded its scope of inventory activities when the National Pollutant Release Inventory (NPRI) was introduced. The NPRI is a publicly accessible database of information on annual releases to air, water and land and off-site transfers for disposal or recycling. The NPRI collects data on substances of concern for the primary purpose of providing Canadians with access to pollutant release information for facilities located in their communities. This program obligates publicly owned and private sector facilities meeting specified reporting criteria and release threshold quantities to report releases and transfers of identified substances. The NPRI also serves as Canada's pollutant release and transfer register in the sense of Article 10 (5) of the Stockholm Convention.

If a facility meets the NPRI reporting thresholds for the list of substances specified in the *Canada Gazette*, the company must report:

- information about the company, its location and number of employees;
- information about each substance that meets the reporting requirements, including the substance name and Chemical Abstracts Service registry number, the nature of the activities (such as whether the substance is manufactured, processed or otherwise used at the facility), the quantity of the substance that is released at the facility to water, air or land, underground injection and/or the quantity of the substance that is transferred off site to another location for final disposal or treatment prior to disposal and the nature of the treatment, the quantity of each reported substance that is transferred off site for recycling and for energy recovery, and the address of the receiving facility;
- the reasons for year-to-year changes in releases, transfers and recycling;
- information on anticipated changes (mandatory for the three years following the reporting year) in releases, transfers and recycling; and
- information on the types of pollution prevention activities undertaken at the facility.

In 2000, following stakeholder consultations, a number of new substances were added to the NPRI list, including dioxins, furans and HCB. The addition of PCBs is at the proposal stage. Facilities engaged in identified activities that have the potential to incidentally manufacture dioxins, furans and HCB are required to submit a report to the NPRI.

The NPRI program is considering changes to reporting requirements for dioxins/furans and HCB, to assist Environment Canada in meeting Canada's domestic and international obligations for reporting of these substances and to increase harmonization efforts with provinces and the U.S. Toxics Release Inventory. The NPRI program is considering the establishment of a subgroup of its current stakeholder working group to examine possible changes to the reporting requirements for dioxins/furans and HCB, as well as the addition of reporting of co-planar PCBs. The subgroup would be tasked with reviewing:

- the merits of including co-planar PCBs with dioxins, furans and HCB;
- linkages between emissions of HCB and emissions of dioxins and furans;
- facilities captured by NPRI reporting requirements;
- the way in which these substances are handled in the U.S. Toxics Release Inventory;
- a more thorough assessment of emissions, taking into account various reporting thresholds for HCB; and
- reporting options, such as the advantages and limitations of reporting in ITEQ or in total grams.

3.1.2.1 Dioxins and furans

The data in Table 3-2 show the releases and transfers of dioxins/furans from point sources reporting to the NPRI in the calendar years from 2000 to 2002. The third column, "On-site releases," includes releases to all media. However, for dioxins/furans, air emissions account for the majority of the releases. As awareness of the NPRI reporting requirements increases, more facilities are reporting, increasing from 299 in 2000 to 342 in 2002, while on-site releases have remained relatively unchanged in 2002 compared with 2000. Data accuracy of some facilities is known to be improving as they implement source testing, thus replacing less reliable earlier data developed through emission factors or engineering estimates.

The three-year record of NPRI information does not encompass the time period when substantial reductions would have occurred from measures implemented prior to the year 2000. For example, releases of dioxins/furans in pulp mill wastewater significantly decreased prior to the year 2000, as shown previously in Table 3-1.

3.1.2.2 Hexachlorobenzene

Table 3-3 shows the annual releases and transfers of HCB beginning in year 2000 through to 2002. Releases to all media increased over this period. In 2000, a new magnesium manufacturing facility in the province of Quebec came on-line and contributed to the increase observed in HCB releases and transfers. In 2003, this facility was indefinitely idled, due to poor market conditions.

Table 3-2: Releases of dioxins and furans from NPRI-reported facilities

Year	Number of facilities	On-site releases (g ITEQ)	Disposal		Off-site releases (g ITEQ)
			On-site (g ITEQ)	Off-site (g ITEQ)	
2000	300	101	100	166	1
2001	334	96	112	164	4
2002	346	93	42	128	6
Percent change (2000–2002)	15%	-8%	-57%	-23%	500%

Source: National Pollutant Release Inventory, Environment Canada, retrieved August 30, 2004

Table 3-3: Releases of HCB from NPRI-reported facilities

Year	Number of facilities	On-site releases (g)	Disposal		Off-site releases (g)
			On-site (g)	Off-site (g)	
2000	300	37 265	0	10 449	48
2001	328	40 825	2 196	28 189	135
2002	342	44 712	143	407 279	93
Percent change	14%	20%	~143%	3 798%	93%

Source: National Pollutant Release Inventory, Environment Canada, retrieved August 30, 2004

3.1.3 *Regional inventories of pollutant releases*

Data systems on pollutant releases are also used as planning tools in support of several major sustainable ecosystem programs across Canada that specially focus on toxic substances of regional importance.

For example, the Great Lakes Binational Toxics Strategy, signed in April 1997, is a collaborative process that provides a forum for stakeholders in Canada and the United States to exchange information on a set of quantitative challenges for certain persistent, anthropogenic toxic substances that threaten the Great Lakes basin. The Great Lakes Action Plan 2000–2005[4] incorporates the actions of the Government of Canada, joint Canada–Ontario activities and actions undertaken in coordination and cooperation with U.S. federal and state agencies. The Great Lakes Regional Air Toxics Inventory has been developed under the *Great Lakes Binational Toxics Strategy*: *Canada–United States Strategy for the Virtual Elimination of Substances in the Great Lakes*. As the largest multijurisdictional effort of its kind in North America, this program has developed an air toxics inventory of more than 80 toxic substances for point, area and mobile sources, including the four UPOPs.

[4] www.on.ec.gc.ca/greatlakes/Programs_and_Services/Action_Plan_2000-2005-WSCDACE085-1_En.htm

Figure 3-2 shows the recent trend in NPRI data for dioxins and furans and HCB based on reporting from 2000 to 2003. Emissions of these UPOPs are generally declining over time due to the programs and measures put in place by Canada for their reduction. The increase in dioxins and furans emissions in 2002 was due to an increase in the number of facilities reporting to the NPRI. The increase in HCB emissions in the same year was due to a combination of changes in both production levels and estimation methods.

3.1.4 Air emissions inventory

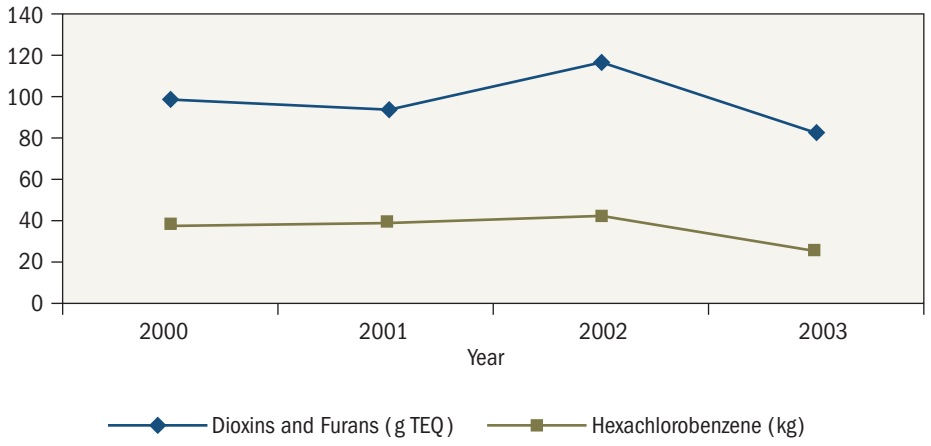
On an annual basis, Environment Canada also prepares comprehensive inventories of dioxin/furan and HCB releases to air, for reporting under the United Nations Economic Commission for Europe's (UNECE) 1998 Protocol on Persistent Organic Pollutants (POPs Protocol) pursuant to the 1979 Convention on Long-range Transboundary Air Pollution. These inventories include emissions to air from point, mobile and area sources and build upon the point source release data reported to the NPRI (see Section 3.1.2). These dioxin/furan and HCB inventories will also serve to meet requirements of the Stockholm Convention.

3.2 Projected releases

Recent initiatives under the auspices of the CCME on the five priority sectors identified for the CWS for Dioxins and Furans are predicted to reduce overall national emissions of dioxins/furans as much as 60%[5] by 2010 as compared with 1999 levels. This represents further reductions in air emissions beyond those obtained since 1990, when dioxin/furan releases to the atmosphere were estimated at 427 g ITEQ.

Future releases of dioxins/furans are predicted to continue in a downward trend as Canada benefits from recent actions and from control measures yet to be undertaken, recognizing that release estimates will continue evolving due to new test data or improved emission factors.

Figure 3-2: NPRI data for dioxins and furans and HCB emissions to air



Source: Rosanna Esposito, Environment Canada
National Pollutant Release Inventory (NPRI) Data for HCB and dioxins and furans

[5] Canadian Council of Ministers of the Environment, *Status of Activities Related to Dioxins and Furans Canada-wide Standards*, Dioxins and Furans Canada-wide Standards Development Committee, February 2003. www.ccme.ca/assets/pdf/d_f_sector_status_rpt_e.pdf

4. LAWS AND POLICIES

Field of sunflowers, Manitoba

The efficacy of Canada's programs on toxics is founded on federal, provincial and territorial legislation and policies for the protection of the environment and human health and for public transparency. The principal legislation and policies in the context of the NAP are described in this chapter.

In Canada, protection of the environment is a responsibility shared by the federal, provincial, territorial and Aboriginal governments, as well as two large municipalities, the Greater Vancouver Regional District and the City of Montreal, which have been delegated responsibilities by their provincial governments. Canadian laws and policies provide the necessary framework to develop and implement strategies to reduce and eliminate UPOPs.

4.1 Legislation

4.1.1 Environmental legislation of the Canadian government

The *Canadian Environmental Protection Act, 1999* (CEPA 1999) is a key piece of legislation used by the Canadian government to protect the environment and human health.[6] The Act embodies a number of fundamental concepts, including the precautionary principle; pollution prevention; the control and management of risks from the use and release of toxic substances, pollutants and wastes; and the virtual elimination of toxic substances that are persistent, are bioaccumulative and result primarily from anthropogenic activity. In addition to conventional regulatory instruments, this piece of legislation provides additional instruments for the management of toxic substances. These include environmental objectives, guidelines and codes of practice; agreements (e.g., administrative, equivalency, federal/provincial/territorial); pollution prevention plans; and environmental emergency plans.

CEPA 1999 is the statutory basis for federal actions on UPOPs, which were listed as toxic substances under the Act on the following dates:

- PCBs in 1988;
- dioxins and furans in 1992; and
- HCB in 2000.

> PCBs were never manufactured in Canada. In Canada, PCBs were the first substances to be regulated under the *Environmental Contaminants Act* (1976). Their use as a constituent in new products manufactured in or imported to Canada was prohibited by the Chlorobiphenyl Regulations (1977) and subsequent amendments. The 1988 *Canadian Environmental Protection Act* (CEPA) replaced the *Environmental Contaminants Act*. PCBs were included on the List of Toxic Substances in Schedule 1 to the Act in 1988. CEPA was itself replaced by CEPA 1999, which retains the regime of toxic substances.

The Compliance and Enforcement Policy[7] for CEPA 1999, March 2001, was developed with the aim of ensuring that environmental laws are adhered to and that the compliance and enforcement actions of government are fairly applied.

[6] www.ec.gc.ca/CEPARegistry/default.cfm

[7] www.ec.gc.ca/CEPARegistry/policies/

In addition to CEPA 1999, the *Canadian Environmental Assessment Act* (CEAA) provides the legal basis for the federal environmental assessment process. CEAA sets out the responsibilities and procedures for carrying out the environmental assessments of projects that involve federal government decision-making. The Act is founded on the following guiding principles:

- to achieve sustainable development by promoting high-quality environmental assessment;
- to integrate environmental factors into planning and decision-making processes;
- to anticipate and prevent degradation of environmental quality; and
- to facilitate public participation in the environmental assessment of projects where the federal government is involved.

4.1.2 Environmental legislation of the provinces and territories

Provinces and territories have legislation and regulations to manage air quality, toxic substances and pesticides. Most provinces and territories have legislation protecting the environment, with regulations that establish permitting or approvals systems for stationary point sources that discharge pollutants to the atmosphere. Most provinces and territories have environmental assessment processes that provide the means to integrate environmental factors into project planning and decision-making.

In nearly all provinces and territories, legislation or regulations require the owners/operators of industrial facilities to obtain operating permits or approvals that can contain emission limits or requirements for any atmospheric pollutant, including hazardous air pollutants. Some provinces, such as Manitoba, list the types of facilities required to have permits or approvals, while others, such as Saskatchewan, impose a general requirement and then list the types of industries excluded from it.

Two basic approaches are used to establish the limits and requirements in permits or approvals — dispersion modelling, to estimate levels of pollutants emitted by the facility in the environment, and technological and/or process requirements. Most provinces use a combination of these approaches. In many cases, permits or approvals are issued for a set length of time and must then be renewed. For new facilities, most provinces and territories now require "best available control technology" or similar requirements.

4.2 Policies

In 1995, the Government of Canada adopted the Toxic Substances Management Policy (TSMP).

The Policy has two key management objectives:

- virtual elimination from the environment of toxic substances that result predominantly from human activity and that are persistent and bioaccumulative (Track 1 substances); and
- management of other toxic substances and substances of concern, throughout their entire life cycles, to prevent or minimize their release into the environment (Track 2 substances).

This Policy puts forward a preventive and precautionary approach to deal with substances that enter the environment and could harm the environment or human health.[8]

In 1998, the CCME adopted a parallel Policy for the Management of Toxic Substances that establishes an integrated, cooperative and concerted approach for the management of toxic substances. Under this Policy, toxic substances that are persistent are bioaccumulative and result primarily from human activity (Track 1 substances) are considered to pose an unreasonable and otherwise unmanageable risk to the environment and human health and are targeted for virtual elimination from the environment.[9]

[8] www.ec.gc.ca/toxics/en/index.cfm

[9] www.ccme.ca/initiatives/environment.html?category_id=27

The above policies have established a unified, national approach for the management of toxic substances that are persistent, are bioaccumulative and result primarily from human activity — namely, virtual elimination.

Virtual elimination of Track 1 substances from the environment will be based on strategies to prevent the measurable release of the substances into the environment. Measurable release limits will be developed as appropriate for a Track 1 substance to allow verification that no measurable release has been achieved; i.e., the *ultimate* goal of all such emission reduction strategies is to reduce concentrations in release streams to levels below these limits. These limits will be established in relation to the lowest concentration of a substance that can be accurately detected and quantified using sensitive but routine analytical methods (level of quantification). Levels of quantification have been identified for dioxins/furans in various media and are presented in Table 4-1. Levels of quantification for HCB and PCBs are in varying stages of development and consideration.

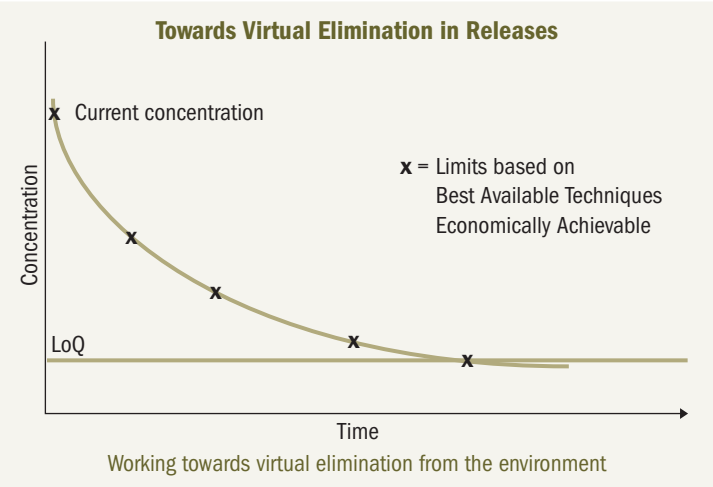
Strategies may also establish interim release limits at levels above the level of quantification based on the concept of best available techniques economically achievable, i.e., taking into account the availability of effective control technologies that can be implemented without undue adverse economic impacts. Such interim limits would be subject to review and revision periodically with the aim of ultimately achieving the level of quantification. The anticipated results from implementation of the TSMP may be depicted as shown in Figure 4-1.

Table 4-1: Levels of quantification for dioxins/furans

Substance	Level of quantification		
	Gaseous releases	Liquids	Soil
PCDDs/PCDFs	32 pg ITEQ/m^3	20 pg ITEQ/L[a]	9 pg ITEQ/g

Note:
[a] Provisional level of quantification for PCDDs/PCDFs in liquids.

Figure 4-1: Anticipated results from application of the Toxic Substances Management Policy



Source: Environment Canada
Note:
LoQ = Level of quantification

5. STRATEGIES TO REDUCE TOTAL RELEASES

For analyzing dioxins and furans, high-resolution gas chromatography, mass spectrometry is the analytical technique used in most laboratories and countries

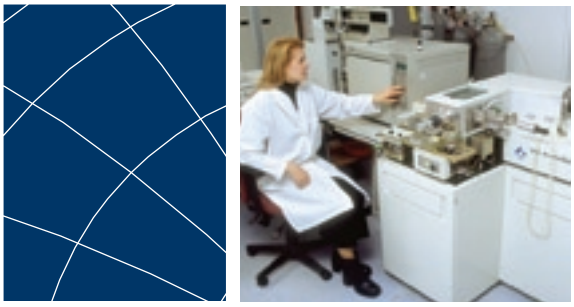


Photo by: Anthony Scullion Photography © Environment Canada

Management of UPOPs in Canada has focused largely on releases of dioxins and furans. The 1990 CEPA assessment report on PCDDs/PCDFs[10] together with the *1999 Inventory of Releases: PCDD/PCDF* (see Chapter 3) have assisted in identifying priority sources for the development and implementation of release reduction measures in Canada.

The 1999 *Strategic Implementation Framework for International Commitments on Hazardous Air Pollutants*, prepared by the National Air Issues Coordinating Committee for the CCME, notes that "reductions in hexachlorobenzene are expected to parallel reductions in dioxin and furan emissions." Less is known about the formation and release of unintentionally produced PCBs; however, it is anticipated that measures to address releases of dioxins/furans will also contribute to the management of unintentionally produced PCBs.

A mix of management tools, including regulatory and voluntary measures as well as information and educational materials, are used in developing the approach most suitable for a specific substance, sector or activity.

Information on sector-specific actions and approaches is presented in the following sections and is tabulated in Appendix A to the NAP.

5.1 Early actions for pulp mill wastewater

In 1992, the CEPA Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations[11] were adopted, prohibiting the release of dioxins/furans in measurable amounts. In addition, controls were placed on precursor compounds in defoamers used in the pulp and paper manufacturing process through the Pulp and Paper Mill Defoamer and Wood Chip Regulations,[12] also adopted in 1992.

As a result of the CEPA pulp and paper regulations and complementary provincial regulatory initiatives, dioxin and furan releases to the aquatic environment were reduced by more than 99%, thereby achieving the goal of virtual elimination. Releases decreased from about 450 g ITEQ in 1988 to about 3 g ITEQ by 1997. This outcome was attributed to the strict standards required (below the level of quantification) for dioxins/furans, which encouraged the industry to switch to an elemental chlorine-free bleaching technology and to substitute products that contained the precursor compounds.

5.2 Canada-wide Standards (CWS)

5.2.1 Canada-wide Accord on Environmental Harmonization

In 1998, the CCME, with the exception of Quebec, signed the Canada-wide Accord on Environmental Harmonization.[13] The objectives of the Accord are to enhance environmental protection, promote sustainable development and achieve greater effectiveness, efficiency, accountability, predictability and clarity of environmental

[10] Government of Canada, *Canadian Environmental Protection Act, Priority Substances List Assessment Report No. 1, Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans*, DSS Catalogue No., En40-215/1E, 1990.

[11] http://laws.justice.gc.ca/en/C-15.31/SOR-92-267/

[12] http://laws.justice.gc.ca/en/C-15.31/SOR-92-268/

[13] www.ccme.ca/initiatives/environment.html?category_id=25#56

management nationally. Through the Accord, governments agree that their environmental management activities will reflect:

- the polluter pays principle;
- the precautionary principle;
- pollution prevention as the preferred approach to environmental protection;
- environmental measures that are performance-based, results-oriented and science-based; and
- other considerations, including open, transparent and accountable public consultation with respect for jurisdictional authority and consensus decision-making.

Periodic review of this Accord by Ministers is included in the terms of the agreement.

5.2.2 Canada-wide Environmental Standards Sub-Agreement

Under the Canada-wide Accord on Environmental Harmonization, CCME Ministers, except the minister from Quebec, signed the Canada-wide Environmental Standards Sub-Agreement, which sets out principles for governments to jointly agree on priorities, develop standards and prepare workplans to achieve those standards. Priority substances for development of CWS have included mercury, dioxins and furans, benzene, particulate matter, ground-level ozone and petroleum hydrocarbons (in soil). The objective of the CWS process is to provide a high level of environmental quality and consistency in environmental management across the country.

The Province of Quebec, while not a signatory to the Canada-wide Accord on Environmental Harmonization or the Canada-wide Environmental Standards Sub-Agreement, has undertaken efforts on environmental standards analogous to those covered by the agreement and has also developed working interjurisdictional arrangements on issues such as monitoring and reporting.

5.2.3 Canada-wide Standards for dioxin and furan emissions from priority sectors

CWS for Dioxins and Furans were developed with a focus on anthropogenic sources releasing dioxins/furans to the atmosphere. Six priority sectors, varying from regional to national in scope and accounting for about 80% of national emissions in the 1999 inventory, were identified as priorities for early action. These included:

- waste incineration (municipal solid waste, hazardous waste, sewage sludge and medical waste);
- the burning of salt-laden wood in coastal pulp and paper boilers in British Columbia;
- residential wood combustion;
- iron sintering;
- electric arc furnace (EAF) steel manufacturing; and
- burning of municipal waste in conical waste combustors in Newfoundland.

CWS for Dioxins and Furans have been endorsed for five of the identified priority sectors, outlined in Table 5-1. The sixth sector, residential wood combustion, is being dealt with through other initiatives, which are described elsewhere in this part of the document.

Development of the CWS took into consideration environmental benefits, available technologies, socioeconomic impacts, opportunities for pollution prevention and collateral benefits from reductions in other pollutants.

Each of the above-noted CWS includes implementation considerations such as timelines for achievement, frequency of emission testing and public reporting on progress. With the exception of the burning of municipal waste in conical waste combustors, numerical standards have been established that represent significant steps towards the ultimate elimination of dioxin/furan releases. Each jurisdiction is responsible for

detailing the means of ensuring achievement of the CWS in a manner consistent with the typical or desired programs for the affected facility/sector and the jurisdiction's legislative and regulatory framework.

Table 5-1 shows the estimated percent contribution from the five priority sectors to the total Canadian 1999 dioxin/furan estimated releases to the atmosphere. The final column shows dates on which the CCME commitments were made for each CWS for Dioxins and Furans.[14]

The CWS priority sectors and the status of their implementation are summarized below. In addition to the standards themselves, pollution prevention strategies have been developed for waste incineration, the burning of salt-laden wood in pulp boilers, iron sintering and steel manufacturing EAFs. The CWS pollution prevention strategies present tools or advice for jurisdictions to consider, and it is at the discretion of each jurisdiction to decide how to use them, in whole or in part.

Table 5-1: Emission contributions of the five Canada-wide Standards for Dioxins and Furans source sectors

Source	1999 emission estimate (g ITEQ)	Percent contribution to total emissions in 1999	Status of CCME Canada-wide Standards for Dioxins and Furans
Conical municipal waste combustion	44	22	CCME endorsed the CWS in November 2003
Waste incineration (municipal solid waste, hazardous waste, sewage sludge and medical waste)	41	20	CCME endorsed the CWS in May 2001
Steel manufacturing EAFs	11	6	CCME endorsed the CWS in March 2003
Iron sintering plants	6	3	CCME endorsed the CWS in March 2003
Pulp mill boilers burning salt-laden wood	5	3	CCME endorsed the CWS in May 2001
Cumulative percentage		54[a]	

Source: Environment Canada

Note:

[a] Total value is rounded.

[14] www.ccme.ca/assets/pdf/df_2004_prgs_rpt_e.pdf

5.2.3.1 Burning of municipal waste in conical waste combustors

The Government of Newfoundland and Labrador is committed to phasing out conical waste combustors within the province by 2008

© G. Dawe

Emissions

Unique to the province of Newfoundland and Labrador, the burning of municipal waste in conical waste combustors resulted in an estimated release of about 44.0 g ITEQ in 1999.

The Government of Newfoundland and Labrador has historically approved the construction and use of conical waste combustors in recognition of the rugged topography, scarcity of overburden and isolated nature of many of its communities. Conical waste combustors were approved for use only where alternative methods of waste disposal were not feasible. While modern municipal waste incinerators employ sophisticated and effective emission controls, conical waste combustors have only screens to retain some of the larger particulate matter.

Standards

Due to the design of conical waste combustors, emission controls are not a feasible option for reducing releases of dioxins and furans from this source. Therefore, this standard proposes to phase out the operation of conical waste combustors in Newfoundland and Labrador and prevent the operation of new conical waste combustors anywhere in Canada.

> Conical waste combustors were also a sector of concern in the CCME's process to develop CWS for mercury emissions. The phase-out strategy will also result in reduced mercury emissions from these combustors.

Implementation

The Government of Newfoundland and Labrador has indicated that it is committed to phasing out existing conical waste combustors within the province by 2008. The goals of the waste management strategy include waste diversion, large-scale composting facilities and province-wide modern waste management, which will ensure reduced dioxin and furan emissions. Any new incinerators will comply with the CWS for Mercury Emissions and the CWS for Dioxins and Furans from incinerators.

New Air Pollution Control Regulations have recently been enacted in Newfoundland and Labrador, which define Ambient Air Quality Standards for Dioxins and Furans and also limit in-stack concentrations of dioxins/furans for new incineration or pyrometric equipment to 80 pg ITEQ/m^3 at reference conditions.[15]

5.2.3.2 Waste incineration

Emissions

Releases of dioxins/furans to the atmosphere from waste incinerators in 1999 were estimated at 41 g ITEQ.

Standard

The standard applies to four categories of incineration: municipal solid waste, hazardous waste, sewage sludge and medical waste.

For new or expanding facilities of any size, pollution prevention techniques, such as a waste diversion program, and best available control techniques are to be applied, to achieve a maximum

[15] Note that reference conditions are 25°C, 101.3 KPa, dry gas basis, corrected to 11% oxygen by volume.

concentration in the exhaust gases of 80 pg ITEQ/m^3 at reference conditions.[16]

For existing facilities, best available pollution prevention and control techniques are to be applied, to achieve a maximum concentration at reference conditions in the exhaust gases from the facility as follows:

- Municipal waste incineration
  - >26 tonnes/year 80 pg ITEQ/m^3 by 2006
  - <26 tonnes/year 80 pg ITEQ/m^3 by 2006
- Medical waste incineration
  - >26 tonnes/year 80 pg ITEQ/m^3 by 2006
  - <26 tonnes/year 80 pg ITEQ/m^3 by 2006
- Hazardous waste incineration 80 pg ITEQ/m^3 by 2006
- Sewage sludge incineration 100 pg ITEQ/m^3 by 2005

Note: Small (<26 tonnes/year) municipal and medical waste incinerators are required to demonstrate *determined efforts* to meet the emission limits through waste diversion and operating practices.

Implementation

Jurisdictions with existing facilities that do not meet the CWS targets will prepare implementation plans. Those that do not have existing facilities will apply the standard for new facilities in conjunction with their permitting processes if proposals are received in the future. Those jurisdictions in which all facilities meet or surpass the standard will work to ensure that facilities remain in compliance. Many jurisdictions have combined their incineration implementation plans for dioxins/furans with those for mercury.

Implementation plans are available for Yukon, Alberta, Manitoba, Saskatchewan, Ontario, New Brunswick, Newfoundland and Labrador and Canada for facilities owned and operated by the federal government.[17]

In addition to the continuing efforts of waste incinerator operators to destroy or capture emissions of dioxins and furans, emphasis is placed on identifying and implementing opportunities to prevent the creation of dioxins and furans as well as emissions of other air pollutants and ash quality generally.

5.2.3.3 Steel manufacturing electric arc furnaces

Emissions

In 1999, dioxin/furan releases to air from steel manufacturing EAFs were estimated to be 11 g ITEQ.

Standard

For new and modified furnaces, dioxin/furan emissions shall be less than 100 pg ITEQ/m^3 at reference conditions.[18]

For existing furnaces, a two-phase approach established emission limits of 150 pg ITEQ/m^3 at reference conditions to be achieved by 2006 and less than 100 pg ITEQ/m^3 at reference conditions by 2010.

The preceding standards are based on research of dioxin/furan minimization techniques, including pollution prevention (e.g., minimizing oil in steel scrap), BAT (e.g., more efficient particulate air pollution control devices) and BEP (e.g., process control and optimization), that can be applied to this source.

Implementation

Jurisdictions with existing facilities that do not meet the CWS targets will prepare implementation plans. Those that do not have existing facilities will apply the standard for new facilities in conjunction with their permitting processes if proposals are received in the future. Those jurisdictions in which all facilities meet or surpass the standard will work to ensure that facilities remain in compliance.

[16] Note that reference conditions are 25°C, 101.3 kPa, 11% oxygen, dry.

[17] www.ccme.ca/ourwork/air.html?category_id=92#337

[18] Note that gas reference conditions are 25°C, 101.3 kPa, operating oxygen levels, dry.

The provinces of Ontario, Manitoba and Saskatchewan have developed implementation plans.[19]

5.2.3.4 Iron sintering plants

Emissions

In 1999, air emissions of dioxins/furans were estimated to be 6 g ITEQ. As a result of plant closures, atmospheric releases decreased significantly from an estimated 25 g ITEQ in 1990. Currently, only one iron sintering facility, located in Ontario, remains operational.

Standard

For new or expanding iron sintering plants, dioxins/furans stack limits are less than 200 pg ITEQ/m^3; as a result of achieving this limit, total particulate emissions should correspond to a level of less than 20 mg/m^3 for new facilities constructed or existing facilities expanding their production capacity after March 2003.

For existing iron sintering plants, a three-phase approach established emission limits of less than 1350 pg ITEQ/m^3 to be achieved by 2002, less than 500 pg ITEQ/m^3 by 2005 and less than 200 pg ITEQ/m^3 by 2010 (at reference conditions).[20]

Implementation

Ontario has the only existing iron sintering plant in Canada. Other jurisdictions will apply the standard for new facilities with their permitting processes if proposals are received in the future.

In accordance with the Province of Ontario's implementation plan for this standard, the Certificate of Approval, which is a legal instrument, for the single iron sintering facility in Canada was amended in July 2002. The Certificate of Approval includes the Phase 1 limit and plans for the implementation of Phases 2 and 3.[21]

5.2.3.5 Coastal pulp and paper boilers burning salt-laden wood

Emissions

Except for one facility in New Brunswick, these facilities are all located in British Columbia. In 1999, emissions of dioxins/furans were estimated to be 5 g ITEQ. As a result of mill closures and voluntary industry initiatives that have reduced atmospheric releases, the current estimate represents a 50% reduction from 1990 releases, estimated to be 10 g ITEQ.

Standards

The dioxin/furan emission limit is less than 100 pg ITEQ/m^3 for new boilers constructed after May 2001 and less than 500 pg ITEQ/m^3 for all existing boilers by 2006.

These standards are based on a mix of techniques, including pollution prevention (e.g., switching to salt-free wood waste), BAT (e.g., installing more efficient particulate emission control devices) and BEP (e.g., washing salt laden wood waste) measures.

Implementation

British Columbia and New Brunswick will implement this CWS through facility operating permits.[22]

Other jurisdictions will apply the standard for new facilities in conjunction with their permitting processes if proposals are received in the future.

Recognizing the ultimate objective of virtual elimination as set out in CEPA 1999, pulp and paper mill operators with boilers burning salt-laden wood will voluntarily pursue further reductions in emissions during the period of the standard.

[19] www.ccme.ca/ourwork/air.html?category_id=95

[20] Note that gas reference conditions are 25°C, 101.3 kPa, operating oxygen levels, dry.

[21] www.ene.gov.on.ca/envision/cws/index.htm#ironsintering

[22] www.ccme.ca/ourwork/air.html?category_id=97

Backyard burning, such as this burn barrel, is a common means of residential waste combustion in rural areas and small towns across Canada

Photo by: Ellen Mortfield © EcoSuperior, 2002

5.3 Emerging sources

5.3.1 On-site residential waste combustion

Emissions of dioxins/furans from on-site residential waste combustion have been estimated to be in the range of 20–40 g ITEQ per year.

Reducing emissions from this area source presents a special challenge, as the development of emission concentration targets is judged to be an ineffective approach. Three elements have been identified that influence a person's decision to burn his or her wastes on site or manage them in a more appropriate manner: education, infrastructure and enforcement. The relative importance of these elements will differ from locality to locality, but addressing all three elements is the key to effective implementation of programs/strategies to reduce the open burning of household and solid waste.[23]

On-site residential waste combustion is typically practised in rural areas and small towns across Canada, most often using domestic "incinerators," such as burn barrels or backyard fire pits.

In many Canadian jurisdictions, a regulatory approach to either prohibit open burning, including backyard burning of household waste, or permit it only under pre-approved conditions has been adopted. Legislation has been used at both the provincial and municipal levels. Nova Scotia has included a ban on open burning in its Solid Waste-Resource Management Regulations[24] under the Environment Act. British Columbia's provincial government provides municipalities with a model municipal by-law to regulate residential backyard burning.[25] An outline of existing legislative and regulatory provincial and territorial initiatives is provided in Appendix B to the NAP.

Public education and awareness are used widely both domestically and internationally to curb backyard burning, even in jurisdictions that have regulations in place. British Columbia has information on health impacts from backyard burning on its website.[26] Backyard burning was identified as a significant issue in the Great Lakes area and has been taken on by Canadian provinces and U.S. states surrounding the lakes through the Great Lakes Binational Toxics Strategy.

Additional measures to those described above will be taken by jurisdictions as necessary.

5.3.2 Open burning at landfills

Emissions of dioxins/furans from open burning at landfills have been estimated to be in the range of 13–24 g ITEQ per year.

Most provincial and territorial jurisdictions have regulations in place to prohibit the burning of municipal solid waste, control the type of waste burned and/or set the conditions that must be met in order to burn. Table 5-2 provides a summary of key information on regulations and other measures related to the practice of burning waste at landfills for each jurisdiction.

Additional measures will be taken by jurisdictions as necessary.

[23] www.openburning.com

[24] www.gov.ns.ca/just/regulations/regs/envsolid.htm

[25] www.env.gov.bc.ca/air/particulates/pdfs/bylaw.pdf

[26] www.env.gov.bc.ca/air/particulates/index.html#2

Table 5-2: Summary of jurisdictional burning regulations

Jurisdictions	Burning regulations (permitted / not permitted)
Alberta	Burning of municipal solid waste is not permitted. The burning of certain quantities of materials from industries such as pulp and paper and forestry is permitted under the guidelines of the Substance Release Regulation. Burning of these materials is not permitted within the boundaries of a city, town or village. Burning of these materials is permitted outside of the boundaries of a city, town or village if certain safety issues such as the construction of a fire break are met.
British Columbia	Burning is not permitted for typical domestic garbage, sawdust and bark. Controlled burning of wood residue such as stumps, brush and untreated wood may be approved under certain provisions. Under the *Waste Management Act*, a regional district may make by-laws regulating, prohibiting or respecting the burning of any class or quantity of municipal solid waste or recyclable materials. The Cariboo region, Central Coast region and East Kootenay region permit the burning of municipal solid waste.
Manitoba	Open burning of mixed municipal solid waste is prohibited. Burning of materials such as wood and paper is permitted.
New Brunswick	The province regulates waste under the *Clean Water Act*, *Clean Environment Act* and *Clean Air Act*. The province permits burning of wood or wood products and recreational fires without a permit. The province strictly prohibits the burning of all domestic waste. This policy was put into effect on November 1, 2002.
Newfoundland and Labrador	Open burning is a concern in the province. In the April 2002 Waste Management Strategy, the province proposed to eliminate open burning at disposal sites by 2005. The report recognizes the difficulty with this elimination in isolated communities.
Northwest Territories	Under guidelines set out by the Northwest Territories Department of Municipal and Community Affairs in February 2003, the open burning of municipal solid waste is not acceptable. The burning of clean wood and paper is allowed.
Nova Scotia	On April 1, 1996, open burning of municipal solid waste was completely banned in Nova Scotia.
Nunavut	Nunavut is currently in the process of developing waste legislation.
Ontario	Only the burning of clean wood and brush is permitted.
Prince Edward Island	No burning is permitted at the landfill site in Prince Edward Island.

(CONTINUED ON NEXT PAGE)

Table 5-2: Summary of jurisdictional burning regulations (CONTINUED)

Jurisdictions	Burning regulations (permitted / not permitted)
Quebec	Open burning practice is allowed in in-trench disposal sites. These sites serve municipalities with <2000 inhabitants located >100 km from a landfill. Open burning is the general practice in the North. Disposal in the North occurs in open dumps.
Saskatchewan	No burning is permitted at the waste disposal ground except for clean wood and lumber, and only when a permit or letter is received from Saskatchewan Environment.
Yukon	Burning is permitted under the Solid Waste Regulations of the *Environment Act*. It must be conducted in accordance with the Air Emissions Regulations, which regulate which materials can and cannot be burned and require permits for the open burning of more than 5 kg of solid waste per day. In addition, the regulations stipulate that burning may be conducted only in appropriate meteorological conditions.

Source: Earth Tech Canada Inc., *Dioxins and Furans Emissions from Open Burning of Municipal Solid Waste in Canada at Landfill Facilities, Final Report*, prepared for the Canadian Council of Ministers of the Environment, March 2004

5.4 Approaches for other identified source categories

5.4.1 Diesel fuel combustion

Diesel fuel combustion was estimated to release 9 g ITEQ of dioxins/furans to the atmosphere in 1999.

The Canadian government has made the Sulphur in Diesel Fuel Regulations, which came into force on July 17, 2002. Low-sulphur diesel fuel is required to enable the efficient operation of advanced exhaust emission control technologies, needed to comply with new heavy-duty diesel vehicle emission standards that will come into effect for the 2007 model year. Correlations between emissions of dioxins/furans and either lower-sulphur fuel or the new emission control technologies that will be needed to comply with the upcoming new emissions standards for diesel-powered vehicles are unknown. However, the Sulphur in Diesel Fuel Regulations, combined with the new on-road vehicle emission standards, will reduce emissions of sulphur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and particulate matter for a new heavy-duty diesel engine by about 95%, 95%, 89% and 90%, respectively.

The Canadian government also made the Regulations Amending the Sulphur in Diesel Fuel Regulations in 2005. The amended regulations will allow new off-road diesel engines to meet emission standards comparable to those of on-road vehicles with advanced emission control equipment when such technology is introduced to off-road engines. The amended regulations also establish limits for sulphur levels in diesel fuel produced, imported and sold for the applications listed in the regulations.

5.4.2 Agricultural/residential fuel combustion

According to the *Inventory of Releases: PCDD/PCDF*, this source sector (note: combustion of fuel other than wood) released about 7 g ITEQ of dioxins/furans to the atmosphere in 1999. There

is uncertainty as to the accuracy of the value of the emission estimate from this source. Better characterization of this source is needed before a determination can be made as to appropriate measures to reduce releases from this source category.

5.4.3 Electric power generation

Electric power generation was estimated to release 5 g ITEQ of dioxins/furans in 1999. Available test data indicate that dioxin/furan emission concentrations at electric power generation facilities are below 80 pg/m^3, which, to date, is the lowest emission limit established in a Canadian emission standard based on available technology and feasibility. No measures are planned with respect to emissions of dioxins/furans at this time.

Guidelines for new thermal electricity generating facilities were recently issued under CEPA 1999. The *New Source Emission Guidelines for Thermal Electricity Generation*[27] recommend limits for releases of sulphur dioxide, NOx and particulate matter discharged to the ambient air. The appropriate regulatory authorities are encouraged to adopt the guidelines as practical baseline standards for new fossil fuel-fired steam generating units within their jurisdiction.

5.4.4 Primary magnesium production

In 2002, there were three primary magnesium producers in Canada, releasing approximately 3.8 g ITEQ of dioxins/furans to the atmosphere (2002 NPRI data). In 2003, the magnesium production facility responsible for the majority of sector dioxin/furan releases was closed due to poor market conditions. This facility was subject to provincial operating limits for discharges of dioxins/furans, PCBs and HCB. The other two facilities released less than 0.5 g ITEQ of dioxins/furans to the atmosphere in 2002.

In addition, the Prohibition of Certain Toxic Substances Regulations, 2005 set a concentration limit for HCB in magnesium salt and magnesium sludge. Under these regulations, HCB contamination cannot exceed 20 ppb.

5.4.5 Base metals smelting

Emissions of dioxins/furans from the base metals smelting sector were estimated to be 3 g ITEQ in 1999.

A Toxics Management Strategy has been developed by Environment Canada for the base metals smelting sector, to address substances released by the sector that were found to be toxic under CEPA 1999, including dioxins and furans. The strategy calls for pollution prevention plans under section 56 of CEPA 1999 in conjunction with an environmental code of practice under section 54 as the preferred measures to address releases from the sector.

On September 25, 2004, a Proposed Notice Requiring the Preparation and Implementation of Pollution Prevention Plans for Releases from Base Metals Smelters was published in the *Canada Gazette*, Part I, for a 60-day public review period. An associated proposed *Environmental Code of Practice for Base Metals Smelters and Refineries, June 2004*, was also made available at that time.

The Proposed Notice contains, as a factor to consider, a site-specific air release limit target for dioxins/furans.

The proposed Environmental Code of Practice contains recommended emission guidelines for dioxins and furans from these facilities. For existing facilities, the proposed guideline is less than 100 pg ITEQ/m^3 at reference operating conditions. For new facilities, the proposed guideline is less than 32 pg ITEQ/m^3 at reference operating conditions.[28]

It is expected that both instruments would be finalized before March 2006.

5.4.6 Residential wood combustion

Residential wood combustion was estimated to release 3 g ITEQ of dioxins/furans to air in 1999.

The use of wood stoves is the fourth most common type of home heating in Canada. Combustion of wood in home appliances

[27] www.ec.gc.ca/CEPARegistry/notices/NoticeText.cfm?intNotice=201&intDocument=1287

[28] Note that reference operating conditions are 25°C, 101.3 KPa, dry gas basis and operating oxygen levels.

releases various pollutants of concern, including dioxins, furans, polycyclic aromatic hydrocarbons (PAHs) and particulate matter (much of it less than 2.5 µm in diameter). Advanced-technology wood stoves dramatically reduce emissions of particulate matter, VOCs, PAHs and other air pollutants that are human health concerns. Emission reductions from residential wood combustion are being pursued nationally through Joint Initial Actions[29] under the CWS for Particulate Matter (PM) and Ground-level Ozone, as well as through other regional change-out and education programs.

Activities under the Joint Initial Action of the PM/Ozone CWS are coordinated through the Ad Hoc Intergovernmental Working Group on Residential Wood Combustion and are focused on an update of the Canadian Standards Association (CSA) standards for new wood-burning appliances; development of a national regulation for new, clean-burning residential wood heating appliances; national public education programs; and an assessment of the option of a national wood stove upgrade or change-out program.

The CSA standard has been updated and published as standard CSA B415.1-00 (*Performance Testing of Solid-Fuel-Burning Heating Appliances*), which specifies performance testing requirements and maximum emission rates.

Natural Resources Canada, in partnership with Health Canada and Environment Canada, has led "Burn-it-Smart!," a national education campaign to promote safer, cleaner and more efficient wood burning practices that operated in the 2001–02 and 2002–03 heating seasons. Information on wood burning practices as well as promotional materials is available on the website.[30] In addition, many provinces, territories and several non-governmental organizations (NGOs) have conducted, and continue to conduct, education and change-out programs using or based on these materials.

The Residential Wood Combustion Working Group has decided not to recommend a national wood stove change-out program at this time. Further information is required to justify the investments necessary for a national change-out program and to conclude that this would be a cost-effective approach to dealing with emissions from residential wood combustion. British Columbia is the most advanced Canadian province, with a regulation in place since 1996, a long-lasting education campaign and a regional wood stove change-out program. The Working Group has recommended that, based on British Columbia's experience with regional change-out campaigns, the province develop a pilot change-out campaign. British Columbia has indicated that it will be undertaking a province-wide change-out program. Analysis of such a project will provide additional useful information to assess the effectiveness of change-out programs.

Newfoundland and Labrador has prepared a regulation on the sale of wood stoves that will be put in place in 2008.

Efforts are now dedicated to establishing an education program for Canadians to increase the level of understanding of the impact of residential wood combustion on ambient air quality and of the means to reduce emissions from residential wood combustion, including use of wood stoves meeting U.S. Environmental Protection Agency (EPA) certification standards as well as other fuel and other heating systems.

The Working Group is now focusing its efforts on developing a model regulation and certification process, as well as model municipal by-laws. A change-out template for regional change-out for municipal and environmental organizations' use may also be developed.

5.4.7 Beehive burners

Beehive burners are utilized primarily by the western forest industry as a means of disposing of clean wood waste. The design and operating characteristics of beehive burners make testing for dioxins and furans very difficult. Despite the lack of specific knowledge, beehive burners are recognized as emitters of dioxins

[29] www.ccme.ca/assets/pdf/pmozone_joint_actions_e.pdf

[30] www.burnitsmart.org

and furans. Releases to the atmosphere are based on estimates of emission factors and volumes of wood waste disposed of in this manner. Emissions for 1999 were estimated at 3 g ITEQ of dioxins/furans.

Beehive burners have not been allowed in New Brunswick since 1990. If alternative uses for residual wood waste cannot be found, the material is currently landfilled.

British Columbia and Alberta implemented programs in the mid-1990s to phase out beehive/conical burners and unmodified silo burners. Alberta developed its Wood Waste Incineration Policy in late 1995, while British Columbia promulgated its Wood Residue Burner and Incineration Regulation on January 1, 1996.

The phasing out of beehive burners in British Columbia and Alberta over the next few years will reduce the amount of wood waste being burned in this type of process by 1 425 000 tonnes. Manitoba is making progress on its goal of phasing out its three beehive burners by 2005, with the largest one having already been replaced by an engineered incinerator.

Although Quebec has no specific plans to phase out these units, new air quality regulations requiring particulate matter emissions of less than 100 mg/m^3 will, in all likelihood, force the remaining units to be shut down. No other types of wood waste incinerators are used in Quebec. Unutilized wood waste is landfilled.

5.4.8 Cement kilns

Available test data from this sector indicate that releases of dioxins/furans from cement kilns are below 80 pg ITEQ/m^3, with one exception. To date, 80 pg ITEQ/m^3 is the lowest emission limit established in a Canadian emission standard based on available technology and feasibility.

In 1996, the CCME published *National Guidelines for the Use of Hazardous and Non-Hazardous Wastes as Supplementary Fuels in Cement Kilns*,[31] with a recommended dioxin/furan emission limit of 0.5 ng ITEQ/m^3 for cement kilns built prior to 1995 and a limit of 0.1 ng ITEQ/m^3 for new plants built after January 1, 1995, or for existing plants undergoing major modifications.

Environment Canada is planning the development of a comprehensive Environmental Code of Practice for Cement Manufacturing Facilities, which would include dioxin/furan emission limits and/or operating practices, taking into account developments with respect to BAT and BEP.

5.4.9 Wood preservation

The wood preservation industry treats wood with waterborne and oil-borne preservatives for both industrial and residential market applications. Those involved in wood preservation activities include the chemical preservative manufacturers, the wood treating plants and the users of both industrial and consumer products.

Only plants using pentachlorophenol (PCP), and therefore only wood treated by this chemical, release significant amounts of dioxins and furans. Since PCP is not manufactured in Canada, this is not a source of releases. Canada imports most of the PCP used by industry from the United States.

The U.S. EPA regulates the dioxin/furan content of end-use pesticide products manufactured in the United States, including PCP. In Canada, the Pest Management Regulatory Agency (PMRA) is responsible for regulating the use of PCP as a pesticide and preservative. Use of PCP is now almost exclusively specified for treatment of utility poles and cross arms. The PMRA has been working with registrants towards the virtual elimination of micro-contaminants, such as dioxins/furans, from pesticides.

Air emissions of dioxins and furans from wood preservative plants using PCP were estimated to be 2 g ITEQ in 1999, and soil releases of dioxins/furans from wood preservative plants using PCP were estimated to be 2 g ITEQ in 1999. Air emissions of dioxins and furans from in-service utility poles treated with PCP were estimated to be 2 g ITEQ in 1999, and soil releases of dioxins and furans from in-service utility poles treated with PCP were estimated to be 9 g ITEQ in 1999.

[31] Canadian Council of Ministers of the Environment, *National Guidelines for the Use of Hazardous and Non-Hazardous Wastes as Supplementary Fuels in Cement Kilns*, prepared by the Hazardous Waste task Group, March 1996.

Releases of dioxins and furans from the sector are being addressed through an initiative focused on the life cycle management of toxic substances and implementation of risk reduction options within the wood preservation sector. This includes implementation of best management practices for wood preservative plants, as documented in *Recommendations for the Design and Operation of Wood Preservation Facilities* (1999).[32] Provinces are using this document as a basis for licences and permits in addition to addressing site-specific issues.

In addition, an Industrial Treated Wood Users Guidance Document is in preparation. This document will outline proper handling, storage, transportation, use and reuse/recycling of treated wood. Included in this process is the development of a national waste management strategy for waste treated wood. As part of this strategy, industrial treated wood users have committed as a group to reduce the volume of material going to landfill by 20% by the end of 2005, based on baseline data from 1990.

A notice requiring the preparation and implementation of pollution prevention plans in respect of certain substances (including dioxins, furans and HCB) used by wood preservation facilities was published on October 22, 2005. This Notice was issued as an instrument respecting preventive or control actions in relation to the specified substances in order to reduce the release of these substances during wood preservation processes to the lowest achievable levels. This is carried out by the application of or by achieving equivalence with the best management practices set out in the document *Recommendations for the Design and Operation of Wood Preservation Facilities, 2004* and the supporting document *Technical Guidelines for the Design and Operation of Wood Preservation Facilities, 2004*.

5.5 Summary of strategies

Tables 5-3 to 5-5 summarize the strategies and approaches described above in relation to requirements under Article 5 of the Stockholm Convention for Annex C, Part II, source categories (see Table 5-3), as well as those for Annex C, Part III, source categories identified through this action plan (see Table 5-4). The final table (Table 5-5) provides available information on other Annex C, Part III, source categories not previously addressed.

Table 5-3: Summary of measures for Annex C, Part II, source categories under the Stockholm Convention

- require, in accordance with this action plan, use of best available techniques (BAT) for new Part II source categories;
- promote, in accordance with this action plan, use of best environmental practices (BEP) for new Part II source categories; and
- promote, in accordance with this action plan, BAT and BEP for existing Part II source categories.

Stockholm Convention Annex C, Part II, source categories	Associated Canadian sector(s)	Description of measures
(a) Waste incinerators, including co-incinerators of municipal, hazardous or medical waste or of sewage sludge;	Waste incineration (municipal waste, hazardous waste, medical waste and sewage sludge)	Incineration Canada-wide Standards for Dioxins and Furans • Dioxin/furan emission limits for new incinerators (effective May 2001) • Dioxin/furan emission limits for existing incinerators (effective 2005–06) • CWS Pollution Prevention Strategy for Incineration

(CONTINUED ON NEXT PAGE)

[32] www.ec.gc.ca/toxics/wood-bois/pubs/trd_e.pdf

Table 5-3: Summary of measures for Annex C, Part II, source categories under the Stockholm Convention (CONTINUED)

Stockholm Convention Annex C, Part II, source categories	Associated Canadian sector(s)	Description of measures
	Conical municipal waste combustion	Conical Waste Combustion of Municipal Waste Canada-wide Standards for Dioxins and Furans • Phase-out of existing facilities by 2008 and prevention of construction of new facilities
(b) Cement kilns firing hazardous waste;	Cement production (currently no knowledge of firing of hazardous waste in Canada)	CCME National Guidelines for the Use of Hazardous and Non-Hazardous Wastes as Supplementary Fuels in Cement Kilns (1996) • Dioxin/furan emission limit for new kilns built after January 1, 1995, and existing kilns undergoing major modifications • Dioxin/furan emission limit for existing kilns built prior to 1995 Note: Planned development of Environmental Code of Practice with dioxin/furan emission limits for new and existing kilns, and publication of Code under CEPA 1999.
(c) Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching;	Pulp and paper production	1992 CEPA Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations: prohibit the release of dioxins/furans in measurable amounts (i.e., must be below the level of quantification) 1992 CEPA Pulp and Paper Mill Defoamer and Wood Chip Regulations
(d) The following thermal processes in the metallurgical industry:		
(i) Secondary copper production;		Facilities are subject to provincial/territorial guidelines or requirements in a permit or order.
(ii) Sinter plants in the iron and steel industry;	Steel manufacturing sector	Iron Sintering Plant Canada-wide Standards for Dioxins and Furans • Dioxin/furan emission limits for new or expanding iron sintering plants (effective March 2003) • Dioxin/furan emission limits for existing iron sintering plants (step-down dates of 2002, 2005 and 2010) • CWS Pollution Prevention Strategy for Iron Sintering Plants
(iii) Secondary aluminium production;		Facilities are subject to provincial/territorial guidelines or requirements in a permit or order.
(iv) Secondary zinc production.		Facilities are subject to provincial/territorial guidelines or requirements in a permit or order.

Table 5-4: Summary of measures to promote, in accordance with this action plan, BAT and BEP for new and existing source categories, such as those in Annex C, Part III, under the Stockholm Convention

Stockholm Convention Annex C, Part III, source categories	Associated Canadian sector(s)	Description of measures
(a) Open burning of waste, including burning of landfill sites;	Uncontrolled combustion of waste: 1. On-site residential waste combustion 2. Open burning at landfills	1. Education programs and model by-law 2. Prohibition of open burning by regulation in most jurisdictions
(b) Thermal processes in the metallurgical industry not mentioned in Part II;	Steel manufacturing electric arc furnaces (EAFs)	Steel Manufacturing EAF Canada-wide Standards for Dioxins and Furans • Dioxin/furan emission limits for new or modified EAFs (effective March 2003) • Dioxin/furan emission limits for existing EAFs (step-down dates of 2006 and 2010) • CWS Pollution Prevention Strategy for Steel Manufacturing EAFs
	Base metals smelting	Publication of Environmental Code of Practice for Base Metals Smelters and Refineries, with dioxin/furan emission limits for new and existing facilities, under CEPA 1999 by March 2006
(c) Residential combustion sources;	Residential wood combustion	Multipollutant approach: targeting improved burning practices, movement towards U.S. EPA or equivalent certified wood stoves or alternative fuel source/technology and regulation • Model regulation and by-law • Regional and community change-out programs • Education programs on smart burning
(d) Fossil fuel-fired utility and industrial boilers;	Thermal electricity generation	No measures planned specific to dioxins/furans CEPA 1999 *New Source Emission Guidelines for Thermal Electricity Generation* for releases of particulates, sulphur dioxide and NOx
(e) Firing installations for wood and other biomass fuels;	Coastal pulp and paper boilers	Canada-wide Standards for Dioxins and Furans • Dioxin/furan emission limits for new boilers (effective May 2001) • Dioxin/furan emission limits for existing boilers (target date of 2005) • CWS Pollution Prevention Strategy for Coastal Pulp and Paper Boilers
	Wood waste beehive burners	Planned phase-out within provinces of British Columbia, Alberta and Manitoba.

(CONTINUED ON NEXT PAGE)

Table 5-4: Summary of measures to promote, in accordance with this action plan, BAT and BEP for new and existing source categories, such as those in Annex C, Part III, under the Stockholm Convention (CONTINUED)

Stockholm Convention Annex C, Part III, source categories	Associated Canadian sector(s)	Description of measures
(f) Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially production of chlorophenols and chloranil;	Pesticide production Wood preservation sector	PCP is not manufactured in Canada. Canada's PMRA has developed a strategy for implementing the federal TSMP and is working with pesticide registrants towards the virtual elimination of micro-contaminants (i.e., dioxins/furans) in pesticides. Releases of dioxins/furans from the wood preservation sector (i.e., use of PCP as wood preservative and PCP-treated wood) are being addressed through an initiative focused on the life cycle management and implementation of risk reduction options, led by Environment Canada.

Table 5-5: Status of other Annex C, Part III, source categories under the Stockholm Convention

Stockholm Convention Annex C, Part III source categories	Status in Canada
(g) Crematoria;	This source category requires further characterization. Crematoria facilities are subject to provincial/territorial guidelines or requirements in a permit or order.
(h) Motor vehicles, particularly those burning leaded gasoline;	Leaded fuel is not used in Canada for motor vehicles, with the exception of competition vehicles until January 1, 2008 (www.ec.gc.ca/CEPARegistry/regulations/detailReg.cfm?intReg=11). No measures planned specific to dioxins/furans. However, regulations in place for diesel fuel and gasoline to comply with new vehicle emission standards targeting pollutant reductions of SOx, NOx, VOCs and PM. CEPA 1999 *Sulphur in Diesel Fuel Regulations* CEPA 1999 *Sulphur in Gasoline Regulations*
(i) Destruction of animal carcasses;	This source category requires further characterization. This activity is subject to provincial/territorial guidelines or requirements in a permit or order.
(j) Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction);	Chloranil is not currently manufactured in Canada. A *Memorandum of Understanding Respecting the Import of Chloranil and Chloranil-derived Substances (CDS)* has been entered into between Environment Canada and Canadian companies importing chloranil or dyes and pigments derived from chloranil into Canada. The Memorandum of Understanding is designed to prevent the entry of dioxin/furan-contaminated chloranil into Canada by requiring importers to discontinue the import of chloranil with a dioxin/furan concentration above 20 ppb ITEQ.

(CONTINUED ON NEXT PAGE)

Table 5-5: Status of other Annex C, Part III, source categories under the Stockholm Convention (CONTINUED)

Stockholm Convention Annex C, Part III source categories	Status in Canada
(k) Shredder plants for the treatment of end of life vehicles;	This source category requires further characterization.
(l) Smouldering of copper cables;	This source category requires further characterization. The province of Saskatchewan has released an Environmental Protection Bulletin on Copper Wire Recycling that identifies provincial regulatory requirements that may apply with respect to the processing of copper wire. It is the position of Saskatchewan Environment that removal of insulation from copper wire must be done only by physical means rather than by burning (www.se.gov.sk.ca).
(m) Waste oil refineries.	This source requires further characterization.

6. USE OF BEST AVAILABLE TECHNIQUES AND BEST ENVIRONMENTAL PRACTICES

Polar bear

Canadian environmental legislation and policies embody overarching best environmental practices (BEP), such as pollution prevention, and the precautionary principle (e.g., CEPA 1999, TSMP).

Pollution prevention is defined in CEPA 1999 as "The use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health or the environment."[33] A similar definition has been adopted by the CCME, as follows: "The use of processes, practices, materials and energy that avoid or minimize the creation of pollutants and wastes at source."[34]

Best available techniques (BAT) are, in general, taken into consideration during the development of instruments to address pollutant releases, such as regulations, environmental codes of practice, Canada-wide Standards, etc., in addition to other factors, such as socioeconomics, environmental co-benefits and impacts.

Strategies in Canada, and as described in the previous chapter, take into account BAT and BEP. For example, the emission limits as set out in the Incineration CWS for Dioxins and Furans are based on BAT environmental performance. Pollution prevention was noted as the preferred approach for reducing and minimizing emissions from incineration facilities. To support pollution prevention as the preferred approach, recommendations on pollution prevention options for waste incineration were developed as tools or advice for jurisdictions to use in whole or in part.

Environmental assessment processes for projects that could have significant impact on the environment, such as new industrial facilities or significant modifications to existing facilities, will also provide opportunity for the consideration of the application or requirement of BAT and BEP. The environmental assessment process may require project proponents to find ways to minimize negative impacts resulting from the undertaking and to review alternatives. The outcome of an environmental assessment process is often a decision to issue or deny approval of the project. When approval is issued, conditions are often applied to reduce the environmental impact of the undertaking.

Annual apple harvest, Nova Scotia

[33] www.ec.gc.ca/NOPP/P2P/en/P2.cfm?par_MenuID=3

[34] www.ccme.ca/initiatives/pollution.html

7. USE OF SUBSTITUTE OR MODIFIED MATERIALS, PRODUCTS AND PROCESSES

Two-year-old child enjoys the tulips, Dows Lake, Ottawa

Photo by: John Place © Statistics Canada

As noted above, pollution prevention is a key principle of CEPA 1999 and one that guides the CCME as well. The Canadian concept of pollution prevention embodies the "use of substitute or modified materials, products and processes to prevent the formation and release of chemicals listed in Annex C" (from Article 5 (c) of the Stockholm Convention).

Early actions taken to address releases of dioxins and furans to water from pulp and paper mills through regulations encouraged the industry to switch to an elemental chlorine-free bleaching technology, thus minimizing the formation of dioxins and furans and preventing their release into the environment. These actions further required industry to substitute products that contained precursor compounds. See Section 5.1 for information on "Early actions for pulp mill wastewater."

Consistent with the third principle of the CCME's Canada-wide Accord on Environmental Harmonization, which set the mandate for their development (i.e., "pollution prevention is the preferred approach to environmental protection"), the CCME CWS for Dioxins and Furans called for the development of pollution prevention strategies. Sector strategies were developed in consultation with stakeholders for:

- waste incineration;
- pulp and paper boilers burning salt-laden wood;
- iron sintering plants; and
- steel manufacturing EAFs.

The recommendations advanced for each sector provided options or tools aimed at minimization of air pollutants for jurisdictions to consider and use in whole or in part. See Section 5.2 for information on "Canada-wide Standards."

Other examples of the use of substitute products and processes include the efforts on residential wood combustion. Education and wood stove change-out programs work towards building awareness of techniques for improved combustion of wood, incentives for increased use of best available wood stove technology and/or the use of alternative heating sources. See Section 5.4.6 for information on "Residential wood combustion."

Fireweed in the mountains, Yukon

© Government of Yukon

8. EDUCATION, TRAINING AND AWARENESS BUILDING

Eric Loring of Inuit Tapitiir Kanatami making a presentation at a Science Class in Nain, Labrador

Stakeholder consultation processes, which are established by Canadian government policy, apply to the development of new management instruments. Accordingly, these processes build early awareness among the affected sources and public stakeholders. The CWS for Dioxins and Furans process employed sector-specific multistakeholder advisory groups in the development of the standards and associated activities (e.g., pollution prevention strategies). Multistakeholder advisory groups included representatives of industry, environment and health NGOs, labour groups and governments (provincial, territorial and federal). Additionally, several national multistakeholder meetings have been held on the CWS for Dioxins/Furans process, further building awareness and engaging those interested.

Public awareness of the human health and environmental effects of toxic substances in general and of dioxins/furans, HCB and PCBs in particular is developed through fact sheets and information materials prepared by federal and provincial/territorial health and environment agencies, as well as industry, industry associations, manufacturers, consumer organizations, and environmental and health NGOs.

Information on dispersed sources such as open burning and residential combustion has been developed by various governmental organizations and NGOs. For example, in 2002, Natural Resources Canada launched an education campaign to promote "smarter" wood burning and published a number of fact sheets. Organizations may apply for a licence from Natural Resources Canada to use the "Burn it Smart!" educational material and the graphic identifier to publicize the value of the project.

In addition to the efforts of governments, regional actions of the private sector are helping focus public attention on wood burning stove technologies and practices. For example, a pilot voluntary wood stove change-out program in Ontario, sponsored by the Hearth Products Association of Canada with support from governments, has resulted in positive environmental benefits.[35] This experience was used to develop an education campaign called *Operation Burn Clean* to encourage wood-burning consumers to purchase or upgrade to safer, cleaner-burning, certified U.S. EPA and CSA B415.1-00 wood-burning appliances.

In British Columbia, the Ministry of Water, Air and Land Protection has established regional burning "hotlines" that persons can call to find out about burning restrictions. Municipalities can use the hotlines to get information to form their own backyard burning guidelines, especially if they have backyard burning by-laws.

Canada will continue to be engaged in consultation processes, workshops and programs in order to promote education, training and awareness building. Canada will continue to explore different ways of reaching out to stakeholders and the general public.

A list of information sources, such as those noted above, is included in Appendix C to the NAP. While this list is not exhaustive, it serves to provide examples of available information sheets and ongoing education and awareness efforts.

[35] www.hpbacanada.org/

9. IMPLEMENTATION SCHEDULE AND STRATEGY REVIEW

Canada lynx

Photo by: © ICN-RCI / Hemera, Statistics Canda, 2003

Chapter 5 of Part II of this document outlines the strategies under way to reduce and, where feasible, eliminate releases of UPOPs. The strategies described include specific targets and timelines for various existing sources (e.g., iron sintering) and more general objectives of behaviour or process change for other identified sources (e.g., residential wood combustion). Measures outlined in Chapter 5 are tabulated in Appendix A to the NAP with identified implementation schedules.

Pursuant to Article 5 (a) (v), the Stockholm Convention calls for the review of strategies in a Party's action plan every five years and reporting on those reviews to the Conference of the Parties under Article 15. In addition to this, Parties will be required to update their NIPs on a periodic basis to be determined by the Conference of the Parties, per paragraph 1 (c) of Article 7.

Canada plans to review the strategies laid out in this action plan and their success in meeting the obligations of Article 5 (a) of the Stockholm Convention on a five-year basis. Canada also plans to update the action plan every five years, in conjunction with the review of strategies. This latter commitment will be reconsidered at each update, taking into account decisions of the Conference of the Parties and other factors of relevance.

The review of strategies and their success in meeting the objectives of Article 5 may take into consideration:

- reductions achieved in releases of UPOPs from identified source categories;
- usefulness and relevance of inventories for UPOPs;
- areas for improvement with respect to current strategies and inventories; and
- identification of new or emerging source categories releasing UPOPs.

Chinatown, Vancouver, B.C.

© Canadian Tourism Commission

10. CONCLUSIONS

Two grizzly bears, Yukon

Canadian programs in science and technology and actions on UPOPs have focused mostly on dioxins and furans for those sources where the most information is available regarding formation, releases, prevention and control techniques. Current actions focus on reducing releases from priority sources as a step towards the goal of minimization and virtual elimination, while continuing to gather information on other less well defined sources.

Ongoing reporting of dioxin/furan and HCB releases and transfers to the NPRI will assist Canada and the public in tracking these substances and the efforts to manage their releases.

As documented in the report, Canada has in place legislation and policies that enable the effective management of UPOPs, with the ultimate goal of virtual elimination of these substances.

Environmental assessment processes are in place that in effect would require BAT (i.e., BAT = best achievable techniques) for new waste incinerators, cement kilns, pulp mills and thermal metallurgical processes such as iron sintering plants. Requirements for BAT can also be incorporated through existing provincial and territorial licensing and assessment processes. In addition, through implementation of the CWS for Dioxins and Furans, BAT is required for sources of priority in Canada, such as steel manufacturing EAFs and coastal pulp and paper boilers burning salt-laden wood. BAT and BEP are promoted through educational programs and technology change-out programs for other more diffuse sources, such as on-site residential combustion of household wastes and residential wood combustion.

Canada will review its strategies for reducing and eliminating releases from unintentional production on a five-year basis. In addition, Canada plans to update its NAP every five years, subject to decisions of the Conference of the Parties and any other relevant factors.

Significant strides in the reduction and virtual elimination of dioxins and furans have been achieved to date in Canada. Building on these efforts, and as documented in this plan, Canada is positioned to further contribute towards the reduction or elimination of POPs releases from unintentional production.

Iceberg in the Arctic

APPENDIX A

Summary of Canada's UPOPs Sources, Releases and Management Strategies

Canada geese

Source	g ITEQ/year[a]	Approach
Releases to atmosphere		
Conical burners	44	CWS signed in November 2003: Newfoundland to phase out by 2008; no new facilities for all jurisdictions
Incineration – all sectors	41	CWS signed in June 2001 New: 80 pg ITEQ/m^3 Existing: 80 pg ITEQ/m^3 by 2006 (sewage sludge incinerators 100 pg/m^3 by 2005)
Steel manufacturing EAFs	11	CWS signed in March 2003 New or modified: 100 pg ITEQ/m^3 Existing: 150 pg ITEQ/m^3 by 2006; 100 pg/m^3 by 2010, plus limits for new or modified
Iron sintering plants	6	CWS signed in March 2003 New or expanding: 200 pg ITEQ/m^3 Existing: 1350 pg ITEQ/m^3 by 2002; 500 pg ITEQ/m^3 by 2005; 200 pg ITEQ/m^3 by 2010
Coastal pulp boilers burning salt-laden wood	5	CWS signed in June 2001 New: 100 pg ITEQ/m^3 Existing: 500 pg ITEQ/m^3 by 2006
On-site combustion of residential household wastes	30 (20–40 midpoint)[b]	Regional programs, such as the Great Lakes Binational Toxics Strategy Jurisdictions will address as necessary
Open burning of municipal waste	19 (13–24 midpoint)[c]	General prohibition of open burning in most jurisdictions Additional measures by jurisdictions will be undertaken as necessary

(CONTINUED ON NEXT PAGE)

Source	g ITEQ/year[a]	Approach
Diesel fuel combustion	9	CEPA 1999 regulation on sulphur in diesel fuel (new limits for sulphur in fuel effective June 1, 2006) No measures specific to dioxins/furans are planned
Agricultural/residential fuel combustion	7	Source characterization needed to determine significance of emissions
Electric power generation	5	CEPA 1999 *New Source Emission Guidelines for Thermal Electricity Generation* No measures specific to dioxins/furans are planned
Magnesium production	3.8[d]	Facility releasing majority of emissions ceased operations in 2003
Base metals smelting	3	CEPA 1999 Environmental Code of Practice – planned for publication by March 2006
Residential wood combustion	3	Pilot provincial change-out program and education programs Jurisdictions will address as necessary
Beehive burners	3	British Columbia, Alberta and Manitoba phase out programs
Cement kilns	2	CCME Guideline Planned CEPA 1999 Environmental Code of Practice
In-service utility poles	2	Wood preservation initiatives addressing alternatives and disposal
Wood preservative plants	2	Wood preservation initiatives addressing dioxin/furan release reductions, established best management practices
Crematoriums	No estimate	Source characterization needed to determine significance of emissions
Copper wire recycling	No estimate	Source characterization needed to determine significance of emissions
Releases to water		
Pulp and paper	3.3	1992 CEPA regulations prohibiting the release of dioxins/furans in measurable quantities Releases have decreased significantly from an estimated 450 g ITEQ in 1988
Releases to soil		
In-service utility poles	9	Wood preservation initiatives addressing alternatives and disposal
Wood preservative plants	2	Wood preservation initiatives addressing dioxin/furan release reductions, established best management practices
In-service railway ties	0.3	Wood preservation initiatives addressing alternatives and disposal

Notes:

[a] All release estimates are for 1999, obtained from the *Inventory of Releases: PCDD/PCDF – Updated Edition* (February 2001), except where otherwise noted.

[b] Release estimate from Gartner Lee Limited report, February 2004.

[c] Release estimate from Earth Tech Canada Inc. report, March 2004.

[d] Releases obtained from the National Pollutant Release Inventory (2002) for primary magnesium production.

APPENDIX B

Jurisdictional Initiatives on On-site Residential Waste Combustion

Mountain scene with lake

Jurisdiction	Statutes/regulations	Description
British Columbia	*Waste Management Act*	General prohibition against causing pollution. Backyard burning is not specifically addressed in statutory provisions or regulations.
Alberta	Substance Release Regulation	Prohibition against burning debris that causes release of dense smoke, offensive odours or toxic substances. Regulation targets non-domestic sources of air pollution but may be interpreted more broadly.
Saskatchewan	*Clean Air Act*	Act gives municipalities the authority to control open air fires for burning of household waste.
Manitoba	*Manitoba Environment Act*	Provides general pollution prevention legislation and opportunity to control emissions of concern from public health or nuisance perspectives.
Ontario	*Environmental Protection Act* Fire Code	The Act provides a general prohibition against discharging a contaminant that causes or is likely to cause an adverse effect. The Fire Code prohibits open air burning unless approved by the Chief Fire Official.
Quebec	Regulation Respecting the Quality of the Atmosphere	General prohibition against open air burning of residual materials; no specific prohibition respecting on-site residential waste combustion.
New Brunswick	Air Quality Regulation	Prohibits burning any material in an open fire without a permit; permitting system administered by the Department of Environment and Local Government; departmental policy prohibits burning domestic waste.
Nova Scotia	Air Quality Regulation (AQR) Solid Waste Resource Management Regulations (SWRMR)	The AQR prohibits open burning of designated materials, including tires, used oil, rubber and plastic. The SWRMR prohibit the open burning of municipal solid waste.

(CONTINUED ON NEXT PAGE)

Jurisdiction	Statutes/regulations	Description
Prince Edward Island	Air Quality Regulations	Prohibits the burning of a range of materials, including domestic waste; permitting system for backyard fires administered by the Department of Environment and Energy.
Newfoundland and Labrador	Pollution Control Regulations	Prohibits open burning of any material that will or is likely to cause air pollution, except with permission of provincial officials.
Nunavut	*Environmental Protection Act*	General prohibition against discharge of contaminants to the environment.
Northwest Territories	*Environmental Protection Act*	General prohibition against discharge of contaminants to the environment.
Yukon	Air Emissions Regulation	General prohibition on open burning of waste in quantities greater than 5 kg.

Source: Gartner Lee Limited, *Approaches to Reducing On-Site Residential Waste Combustion*, prepared for the Canadian Council of Ministers of the Environment, February 2004

Cliff houses, Newfoundland

APPENDIX C

Examples of Information Sources and Fact Sheets on Unintentionally Produced POPs, Their Sources and/or Measures to Reduce Releases

Northern Lights

Alberta Environment, Consultant's Report: Background Document on Recycling Waste from Computers
www3.gov.ab.ca/env/waste/aow/flcr/documents/ComputerStudy.pdf

Alberta Environment, Electronic Recycling Program Overview
www3.gov.ab.ca/env/waste/ewaste/index.html

British Columbia Ministry of Water, Land and Air Protection, Particulates: Backyard Burning: Smoke Gets in Your Eyes... and Lungs!
www.env.gov.bc.ca/air/particulates/bbsgiyea.html

Canadian Centre for Pollution Prevention, Great Lakes Trash and Open Burning Website
www.openburning.com

Canadian Council of Ministers of the Environment, Canada-wide Standards for Dioxins and Furans
www.ccme.ca/ourwork/air.html?category_id=91

Environment Canada, Management of Toxic Substances, Polychlorinated dibenzodioxins and polychlorinated dibenzofurans
www.ec.gc.ca/TOXICS/EN/detail.cfm?par_substanceID=28&par_actn=s1

Health Canada, It's Your Health: Dioxins and Furans
www.hc-sc.gc.ca/english/iyh/environment/dioxins.html

Manitoba Conservation, Information Bulletin: Implications of Open Burning of Garbage at Waste Disposal Grounds
www.gov.mb.ca/conservation/airquality/brochures/waste_burning_e.html

Ministère de l'Environnement du Québec, Autres sujets d'intérêt, Les BPC, DDT, dioxines, furannes et autres organochlorés
www.menv.gouv.qc.ca/eau/guide/autres.htm#bpc-ddt

Natural Resources Canada, Burn it Smart! Chauffage au bois: Soyons responsables!
www.burnitsmart.org/

Newfoundland and Labrador Department of Environment and Conservation, Recycling and Reuse Guide (April 2002)
www.gov.nf.ca/env/Env/PollPrev/waste_manag/rrguide1.pdf

Northwest Territories Resources, Wildlife and Economic Development, Environmental Protection Service, Municipal Solid Wastes Suitable for Open Burning
www.enr.gov.nt.ca/library/pdf/eps/burning.pdf

Ontario Ministry of the Environment, Green Facts: Dioxins and Furans
www.ene.gov.on.ca/cons/681e01.htm

Prince Edward Island, InfoPEI, Dangers of Burning Plastic
www.gov.pe.ca/infopei/onelisting.php3?number=60944

Saskatchewan Environment, Environmental Protection Bulletin: Copper Wire Recycling
www.se.gov.sk.ca/environment/protection/land/Copper_Recycling.pdf

Notes: