The Great Lakes Binational Toxics Strategy

CANADA -- UNITED STATES
STRATEGY FOR THE VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES IN THE GREAT LAKES

Purpose

In keeping with the objective of the *Revised Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987* (1987 GLWQA) to restore and protect the Great Lakes, the purpose of this binational strategy (the Strategy) is to set forth a collaborative process by which Environment Canada (EC) and the United States Environmental Protection Agency (USEPA), in consultation with other federal departments and agencies, Great Lakes states, the Province of Ontario, Tribes, and First Nations, will work in cooperation with their public and private partners toward the goal of virtual elimination of persistent toxic substances resulting from human activity, particularly those which bioaccumulate, from the Great Lakes Basin, so as to protect and ensure the health and integrity of the Great Lakes ecosystem. In cases where this Strategy addresses a naturally-occurring substance, it is the anthropogenic sources of pollution that, when warranted, will be targeted for reduction through a life-cycle management approach so as to achieve naturally-occurring levels. An underlying tenet of this Strategy is that the governments cannot by their actions alone achieve the goal of virtual elimination. This Strategy challenges all sectors of society to participate and cooperate to ensure success.

The goal of virtual elimination will be achieved through a variety of programs and actions, but the primary emphasis of this Strategy will be on pollution prevention. This Strategy reaffirms the two countries' commitment to the sound management of chemicals, as stated in *Agenda 21: A Global Action Plan for the 21st Century* and adopted at the 1992 United Nations Conference on Environment and Development. The Strategy will also be guided by the principles articulated by the International Joint Commission's (IJC) Virtual Elimination Task Force (VETF) in the *Seventh Biennial Report on Great Lakes Quality*.

This Strategy has been developed under the auspices of the Binational Executive Committee (BEC), which is charged with coordinating the implementation of the binational aspects of the 1987 GLWQA. The BEC is co-chaired by EC and USEPA, and includes members of the Great Lakes states, the Province of Ontario, and other federal departments and agencies in Canada and the United States (U.S.).

Environmental Context

The Great Lakes are an extraordinary natural endowment, holding 18 percent of the world's supply of surface fresh water. They are home to 33 million people, 47 percent of whom draw their drinking water from the Lakes. The Great Lakes are also vital to many North American fish and wildlife species. Their wealth of natural resources has long made the region a heartland of economic strength.

During the 1970s, it became apparent that pollution caused by persistent toxic substances was harming Great Lakes species and posing risks to human and wildlife consumers of fish. Accordingly, under the *Great Lakes Water Quality Agreement of 1978*, the U.S. and Canada pledged to seek the virtual elimination of the discharge of persistent toxic substances to the Great Lakes.

The risks to human, fish and wildlife health came to the fore again during the 1980s when public attention became focused on the Niagara River and Lake Ontario. These concerns led to the negotiation and signing, separate from the 1987 GLWQA, of the four-party *Niagara River Declaration of Intent* (DOI) in 1987, and the development of the Lake Ontario Toxics Management Plan, which has been incorporated into the Lake Ontario Lakewide Management Plan (LaMP) program.

The 1987 GLWQA established a process, set of commitments, and general principles for developing and implementing Remedial Action Plans (RAPs) for geographic Areas of Concern (AOCs) and LaMPs.

In 1991, in response to a recommendation from the IJC, the governments of Canada, the U.S., Michigan, Minnesota, Ontario and Wisconsin developed the Binational Program to Restore and Protect the Lake Superior Basin (Binational Program). The purpose of the Binational Program was to protect the high quality waters of the Lake Superior Basin, to restore degraded areas therein, and to achieve zero discharge of designated persistent and bioaccumulative toxic substances from point sources in the Basin.

In 1994, the *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem* (COA) was established to ensure implementation of the requirements of the 1987 GLWQA. In 1995, in the U.S., the final *Water Quality Guidance for the Great Lakes System* (GLI) was published, establishing a process for developing consistent water quality standards across the Great Lakes system. The Strategy builds on and complements all of these efforts.

Significant successes in reducing persistent toxic substances in the Great Lakes include cleanup of contaminated sediment sites at Great Lakes harbors, reduced levels of PCBs, dioxins and DDT, and improved sport fisheries. Researchers have also observed an increase in the number of certain wildlife species (e.g., eagles and cormorants).

Even with the important accomplishments in toxics reduction achieved by the RAPs, the LaMPs, the Niagara River DOI and the Binational Program over the past decade, and the actions taken by both countries to ban, cancel, and restrict the use of a number of persistent toxic substances, these substances continue to be present in the Great Lakes ecosystem. For example, contaminated bottom sediments pollute certain harbors, impeding navigational dredging and the economic potential for use of these waters. Unacceptable levels of PCBs, methyl mercury, and toxaphene require the continued issuance of fish consumption advisories, suppressing the economic potential of the region's fisheries industries and presenting a continued human health risk. More recently, there has been growing public concern about, and active government investigation into, toxic pollutants that may produce non-cancerous health effects in wildlife and in humans, including reproductive and hormonal disruption and learning disabilities.

The continuing presence of these persistent toxic substances is the result of atmospheric deposition, release from contaminated bottom sediments, releases from various industrial processes, releases from non-point sources, and continuous cycling of naturally-occurring and anthropogenic substances within the Great Lakes themselves. In some cases, there may also be illegal or accidental discharge of stored substances for which production and use has previously been cancelled or banned. All of these factors highlight the need for more to be done.

This Strategy acknowledges and builds on the existing Canadian and U.S. regulatory programs which address the targeted substances. In Canada, these include the programs under the Canadian Environmental Protection Act, the Fisheries Act, the Canadian Environmental Assessment Act, the Pest Control Products Act, the Ontario Environmental Protection Act, the Ontario Water Resources Act, the Ontario Environmental Assessment Act, and an array of other federal and provincial acts which bear on protection of the Great Lakes Basin Ecosystem from the polluting effects of these substances. In the U.S., these include the Comprehensive Environmental Response, Compensation and Liability Act, the Resource Conservation and Recovery Act, the Clean Water Act, the Clean Air Act, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, and other regulatory programs. Both countries acknowledge that more needs to be done.

The "unfinished business" of virtually eliminating persistent toxic substances in the Great Lakes Basin remains a significant challenge. To contribute to the resolution of this problem, more strategic and coordinated interventions are required at various geographic scales, from the local watershed/AOC to the lakewide, basin-wide, national, and international arenas. Movement of persistent toxic substances does not respect jurisdictional or geographic borders. In particular, the inter-basin transfer of persistent toxic substances from one lake to another and the short- and long-range movement and deposition of these substances from the air have compelled EC and USEPA to develop this coordinated binational Strategy.

The Strategy is intended to encourage ongoing programs or emerging initiatives to better address toxic releases; to provide a context of basin-wide goals for localized actions; and to provide "out of basin" support to Great Lakes Basin programs such as LaMPs and RAPs.

Approach to Virtual Elimination

In Article II(a) of the 1987 GLWQA, the two countries agreed that "...the discharge of any and all persistent toxic substances be virtually eliminated" and agreed to develop programs and measures to implement the GLWQA, including "measures for the control of inputs of persistent toxic substances including control programs for their production, use, distribution, and disposal..." (GLWQA, Article VI (k)). To accomplish this objective, the IJC in 1990 urged the Parties to develop and implement "a comprehensive, binational program to lessen the uses of, and exposure to persistent toxic chemicals found in the Great Lakes environment." In their response to the IJC's *Seventh Biennial Report on Great Lakes Water Quality*, both the U.S. and Canada reaffirmed their commitment to work on such a binational Strategy, to promote implementation of commitments in the 1987 GLWQA. Since that time, both countries have undertaken their own virtual elimination efforts, Canada through its Toxic Substances Management Policy (TSMP), and the U.S. through its Virtual Elimination Pilot Project.

In February 1995, Prime Minister Chrétien and President Clinton confirmed the commitment by the U.S. and Canada to work together to develop a binational strategy to address the most persistent toxic substances in the Great Lakes environment. The two countries prepared this Strategy, building on past and ongoing virtual elimination efforts in the Basin, including the extensive work by the IJC in its framework outlined in the VETF report. The Strategy also incorporates suggestions, ideas and concepts embodied in the 6th and 7th IJC Biennial Reports.

This Strategy will follow the framework outlined in *Agenda 21: A Global Action Plan for the 21st Century* and adopted at the 1992 United Nations Conference on Environment and Development. In this framework, the U.S. and Canada (and other nations) committed, where appropriate to:

> *undertake concerted activities to reduce risks for toxic chemicals, taking into account the entire life-cycle of the chemicals. These activities could encompass both regulatory and non-regulatory measures, such as promotion of the use of cleaner products and technologies; emission inventories; product labeling; use limitations; economic incentives; and the phasing out or banning of toxic chemicals that pose an unreasonable and otherwise unmanageable risk to human health and the environment, including those that are toxic, persistent and bioaccumulative and whose use cannot be adequately controlled; and*
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> *adopt policies and regulatory and non-regulatory measures to identify, and minimize exposure to, toxic chemicals by replacing them with less toxic substitutes and ultimately phasing out the chemicals that pose unreasonable and otherwise unmanageable risk to human health and the environment and those that are toxic, persistent and bioaccumulative and whose use cannot be adequately controlled.*

This concept of Virtual Elimination, as acknowledged by the IJC and for purposes of this Strategy, also recognizes that it may not be possible to achieve total elimination of all persistent toxic substances -- some may be produced by, or as a result of natural processes and so may persist at background or "natural" levels. In addition, total or complete elimination may

not be possible for technological or economic reasons. In cases where the Strategy addresses a naturally-occurring substance, it is the anthropogenic sources of pollution of that particular substance which, when warranted, will be targeted for reduction through a life-cycle management approach so as to achieve naturally-occurring levels. To accomplish the objective of restoring and maintaining the integrity of the Great Lakes, the Strategy seeks to reduce and virtually eliminate the input of persistent toxic substances to the Great Lakes[1]. Virtual elimination will be sought within the most expedient time frame through the most appropriate, common sense, practical and cost-effective blend of voluntary, regulatory or incentive-based actions. All feasible options will be considered, including pollution prevention, phase-outs and bans[2].

Actions identified in this Strategy will be complemented by other existing or proposed regulatory and non-regulatory initiatives. In addition, it is anticipated that actions and challenges identified in this document will evolve over time as information about opportunities, cost effectiveness, and benefits becomes available. Virtual elimination may not be achievable tomorrow, but the challenges and actions outlined in this Strategy represent significant milestones on the path toward this goal.

Analytical Framework

EC and the USEPA, in cooperation with their partners, will use a four-step process to work toward virtual elimination.

1. Information gathering

   Identify to the extent feasible, the full range of sources, both point and non-point, within and outside the Basin which release the selected substances, by economic sector, and examine which sector(s) may be contributing to the presence of the substance in the Basin. Within each source, identify why and how the substance is used or released, e.g., used as a product or released as a byproduct. This step may include examining the entire life cycle of the substance, from initial decision to use through eventual disposal. Also, specific characteristics of a substance such as whether it is naturally occurring, or whether its release results from human use, will be considered. Information gaps and uncertainties as to sources, multi-media loadings and associated impacts of specific substances will be identified and actions recommended to address them.

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[1] Hereafter, the terms “substances” or “Strategy substances” shall mean persistent toxic substances resulting from human activity, particularly those which bioaccumulate, and which are the focus of efforts under this Strategy. For further information on the meaning of persistent toxic substances, see the Glossary and Appendix I.

[2] In the U.S., existing and currently planned regulatory actions will contribute to meeting the goal of virtual elimination; however, this Strategy is not a regulatory action, nor is it expected, in and of itself, to lead to the promulgation of any rule or regulation. To the extent that regulatory actions are taken with regard to Strategy substances, they will be governed by the statutes authorizing the actions.

2. Analyze current regulations, initiatives and programs which manage or control substances

Assess how existing laws, regulations and programs influence the presence of these substances in the Basin, and their long-range transport across states, provinces, regions and international borders. Identify the gaps in these regulations, programs and initiatives that offer opportunity for the most effective and appropriate reductions of these substances.

3. Identify cost-effective options to achieve further reductions

Identify options that may offer opportunities for new or modified measures, including emission trading schemes, pollution prevention, or other alternative approaches, which may speed up the pace or increase the level of reductions, taking into account cost effectiveness.

4. Implement actions to work toward the goal of virtual elimination

Using cost-effective measures, recommend and implement actions that work toward the goal of virtual elimination, consistent with the approach outlined in this Strategy.

With respect to some substances, EC and USEPA have already taken one or more of these steps, as discussed further in **Attachment 1**.

Principles

This Strategy builds on the framework adopted by Canada and the U.S. and other countries around the world in Chapter 19 of Agenda 21 on Environmentally Sound Management of Toxic Chemicals, and the principles advanced by the IJC's VETF for a virtual elimination strategy. Therefore, it is agreed that in implementing this Strategy, EC and the USEPA, in cooperation with their partners:

- recognize that the Strategy substances do not respect international boundaries; they pass between nations via the atmosphere, in shared waters, and through trade or transboundary movement of products and wastes. Therefore, the two nations cannot protect their citizens solely through bilateral actions. Canada and the U.S. will work with other nations to share scientific information and work with them toward international accords to address these substances, where appropriate. Some examples of the international efforts with which Canada and the U.S. will be coordinating include: the development of a global agreement on persistent organic pollutants (POPs), as called for in a recent meeting of the Governing Council of the United Nations Environment Programme (UNEP); the development of protocols on POPs and heavy metals under the United Nations Economic Commission for Europe (UNECE) Convention on Long Range Transboundary Air Pollution (LRTAP); cooperative actions to implement the October 1995 Resolution on the Sound Management of Chemicals developed by the Commission for Environmental Cooperation (CEC) under the North American Agreement on Environmental Cooperation (NAAEC); and other chemicals-related activities under UNEP, the Intergovernmental Forum on Chemical Safety (IFCS) and other bodies.

- reaffirm their shared responsibility to work toward the goal of virtual elimination and to recognize that the two countries' respective domestic measures to achieve that goal must respect the institutional, environmental and socio-economic context of each country. Each country has discretion to include and act in accordance with its domestic national policies in meeting the commitments of this Strategy, recognizing the need for flexibility in determining how to meet these commitments and the possibility that some actions and challenges will evolve over time as information about opportunities, and their associated costs and benefits becomes available. Canada and the U.S. are free at all times to take actions and pursue targets more stringent than those identified in this Strategy. Each country will build on the efforts of states/provinces, industries and local communities, both within and outside the Basin.

- favor "cleaner, cheaper and smarter" ways to reduce the Strategy substances, focusing on the best opportunities across a substance's life to reduce its releases. EC and USEPA believe that pursuing a long-term, phased

strategy through prevention where possible and remediation when necessary, is a common sense, practical approach to achieving environmental objectives.

- are committed to an open, interactive, public participation process, which includes issuing regular progress reports to the public. While the two federal governments must lead, they alone cannot achieve the goal of virtual elimination. Other levels of government, industry and society as a whole must share the responsibility to restore and maintain the health of the Great Lakes Basin.

- will collaborate in, and support voluntary initiatives by major use and release sectors and others to reduce and eventually eliminate the use, generation or release of Strategy substances. In the case of naturally-occurring substances, collaborative efforts will consider life-cycle management approaches to achieve the desired reductions.

Scope and Effect

Recognizing that virtual elimination is a long-term objective, this Strategy provides a framework to achieve specific actions from 1997 to 2006. These actions and goals represent milestones along the path to virtual elimination. This Strategy embraces actions to reduce and virtually eliminate persistent toxic substances resulting from human activity, particularly those which bioaccumulate, that affect or have the potential to affect the Great Lakes ecosystem, taking into account all relevant factors. In cases where this Strategy addresses a naturally-occurring substance, it is the anthropogenic sources of pollution that, when warranted, will be targeted for reduction through a life-cycle management approach so as to achieve naturally-occurring levels. This Strategy reflects the firm commitment of Canada and the U.S. to better focus and coordinate existing programs toward the goal of virtual elimination of Strategy substances, without giving rise to legal obligations on the governments or on the public. Nothing in this Strategy affects the legal status of the 1987 GLWQA.

The scope of the Strategy and its associated commitments and activities will be focused primarily on the Great Lakes Basin. However, with respect to atmospheric deposition, consistent with the provisions of Annex 15 of the GLWQA, the traditional concept of the geographic area which impacts the Basin will be expanded to recognize the long-range transport of Strategy substances adversely affecting the quality of the Great Lakes ecosystem.

To facilitate the reductions envisaged in the Strategy, EC and USEPA will work in cooperation with other responsible jurisdictions on a national and international basis, to strengthen linkages to all existing toxics reduction efforts, and to ensure that goals are harmonized and actions are coordinated to achieve environmental progress. As part of this task, EC and USEPA will work to coordinate efforts under the Strategy so that they are complementary with other international efforts cited earlier, such as efforts to develop LRTAP Convention Protocols on Persistent Organic Pollutants (POPs) and heavy metals, the CEC Resolution on the Sound Management of Chemicals, the UNEP and IFCS initiatives, and the multilateral negotiations on POPs.

This Strategy includes those actions undertaken jointly by EC, USEPA and their partners, as well as those actions undertaken individually through each nation's domestic programs and processes.

Within the context of the Strategy, EC and USEPA will seek the cooperation of their partners to address Strategy substances coming from long-range transport outside the Basin that enter the Great Lakes ecosystem, while supporting and building upon the ongoing processes in the LaMPs and the RAPs to reduce "within basin" sources. It is expected that the LaMPs and RAPs will make important contributions to the goal of virtual elimination and will provide means to identify opportunities to achieve "within-basin" load reductions. The individual LaMPs will be focused on those chemicals that are of concern in that particular basin, and those which have the potential to migrate to other lakes or waterways; the LaMP reduction targets may also be more stringent than those in the Strategy. Reductions achieved through within-basin efforts will be very important to meeting the challenges, and helping to ensure the success, of this Strategy.

EC and USEPA recognize that many "critical pollutant" lists exist. For purposes of this Strategy, they have chosen to focus actions first on those substances that have been identified for priority action by multiple screening criteria and processes (see **Appendix I**). In essence, these are substances that are present in the water, sediment or aquatic biota

of the Great Lakes system and that are exerting, singly or in synergistic or additive combination, a toxic effect on aquatic, animal, or human life.

"Level I" substances as listed in **Appendix I** represent the primary focus around which the governments will concentrate and lead actions and efforts. Since these Level I substances have been associated with or have the potential to cause deleterious environmental impacts because of their presence in the Basin, they represent an immediate priority and are targeted for virtual elimination through pollution prevention and other incentive-based actions that phase out their use, generation or release in a cost-effective manner within the most expedient time-frame. For anthropogenic sources of naturally-occurring substances, the Strategy will, when warranted, seek to reduce such sources so as to achieve naturally-occurring levels.

The Strategy also includes actions for a second set of substances ("Level II" substances) -- listed in **Appendix I** -- that have been identified by one or both countries as having the potential to significantly impact the Great Lakes ecosystem through their use and/or release. Until and unless these substances are placed on the Level I list, the governments encourage stakeholders to undertake pollution prevention activities to reduce levels in the environment of those substances nominated jointly by both countries, and to conform with the laws and policies of each country, including pollution prevention, with respect to those substances nominated by only one country.

USEPA and EC intend to consult with stakeholders on proposed changes to the lists at the biennial meeting of the State of the Lakes Ecosystem Conference (SOLEC) or another appropriate forum. Existing processes for nominating or elevating substances will be used, e.g., Bioaccumulative Chemicals of Concern (BCCs) in the U.S., TSMP, and COA in Canada, or LaMP Critical Pollutants. It is not the intent of the Strategy to initiate a new nominating process. Existing nominating and chemical screening processes already include a strong public participation component.

The two nations will share information regarding the persistence, bioaccumulation potential, and toxicity of Level II substances. In addition, EC and USEPA in cooperation with their partners will periodically examine the substances addressed by the Strategy to determine whether any Level II substances should be elevated to the Level I list, whether new substances which present threats to the Great Lakes ecosystem should be considered for inclusion on the Level I or II lists, and whether any other changes should be made. If a substance is identified as Level I the two countries will set binational virtual elimination challenges for it. Elevation to Level I or removal of a substance from Level II will be made with appropriate opportunity for public review and comment.

Challenges

EC and USEPA, working in cooperation with their partners, accept the following challenges as significant milestones on the path toward virtual elimination. These milestones will be achieved by implementing voluntary efforts to achieve reductions of particular Level I substances and through currently anticipated regulatory actions under environmental laws in both countries. In Canada, the baseline used for these milestones will be 1988, in keeping with the Accelerated Reduction and Elimination of Toxics Program (ARET) baseline and the 1987 GLWQA. For the U.S., the baseline from which reductions will be measured is unique for each substance, and is identified in **Attachment 1**; the best available data will be used, which in most cases is the most recent baseline.

As new information and data on opportunities, and their associated costs and benefits become available, EC and USEPA may revise the milestones, using a public consultation process involving their partners. In some cases, the challenges may differ between EC and USEPA based on different start dates for their respective domestic toxics reduction programs, different regulatory and legislative authorities, and different chemical data bases, baselines and inventories.

EC and USEPA will work with their partners to:

- U.S. Challenge: Confirm by 1998 that there is no longer use or release from sources that enter the Great Lakes Basin of five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), and of the industrial byproduct/contaminant octachlorostyrene. If ongoing, long-range sources of these substances from

outside of the U.S. are confirmed, work within international frameworks to reduce or phase out releases of these substances.
Canadian Challenge: Report by 1997, that there is no longer use, generation or release from Ontario sources that enter the Great Lakes of five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), and of the industrial byproduct/contaminant octachlorostyrene. If ongoing, long-range sources of these substances from outside of Canada are confirmed, work within international frameworks to reduce or phase out releases of these substances.

- U.S. Challenge: Confirm by 1998, that there is no longer use of alkyl-lead in automotive gasoline. Support and encourage stakeholder efforts to reduce alkyl-lead releases from other sources.
  Canadian Challenge: Seek by 2000, a 90 percent reduction in use, generation, or release of alkyl-lead consistent with the 1994 COA.

- U.S. Challenge: Seek by 2006, a 90 percent reduction nationally of high-level PCBs (>500 ppm) used in electrical equipment. Ensure that all PCBs retired from use are properly managed and disposed of to prevent accidental releases within or to the Great Lakes Basin.
  Canadian Challenge: Seek by 2000, a 90 percent reduction of high-level PCBs (>1 percent PCB) that were once, or are currently, in service and accelerate destruction of stored high-level PCB wastes which have the potential to enter the Great Lakes Basin, consistent with the 1994 COA.

- U.S. Challenge: Seek by 2006, a 50 percent reduction nationally in the deliberate use of mercury and a 50 percent reduction in the release of mercury from sources resulting from human activity. The release challenge will apply to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin. This target is considered as an interim reduction target and, in consultation with stakeholders, will be revised if warranted, following completion of the Mercury Study Report to Congress.
  Canadian Challenge: Seek by 2000, a 90 percent reduction in the release of mercury, or where warranted the use of mercury, from polluting sources resulting from human activity in the Great Lakes Basin. This target is considered as an interim reduction target and, in consultation with stakeholders in the Great Lakes Basin, will be revised if warranted, following completion of the 1997 COA review of mercury use, generation, and release from Ontario sources.

- U.S. Challenge: Seek by 2006, a 75 percent reduction in total releases of dioxins and furans (2,3,7,8-TCDD toxicity equivalents) from sources resulting from human activity. This challenge will apply to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin. Seek by 2006, reductions in releases, that are within, or have the potential to enter the Great Lakes Basin, of hexachlorobenzene (HCB) and benzo(a)pyrene [B(a)P] from sources resulting from human activity.
  Canadian Challenge: Seek by 2000, a 90 percent reduction in releases of dioxins, furans, HCB, and B(a)P, from sources resulting from human activity in the Great Lakes Basin, consistent with the 1994 COA. Actions will focus on the 2,3,7,8 substituted congeners of dioxins and furans in a manner consistent with the TSMP.

- U.S. and Canadian Challenge: Promote pollution prevention and the sound management of Level II substances, to reduce levels in the environment of those substances nominated jointly by both countries, and to conform with the laws and policies of each country, including pollution prevention, with respect to those substances nominated by only one country. Increase knowledge on sources and environmental levels of these substances.

- U.S. and Canadian Challenge: Assess atmospheric inputs of Strategy substances to the Great Lakes. The aim of this effort is to evaluate and report jointly on the contribution and significance of long-range transport of Strategy substances from world-wide sources. If ongoing long-range sources are confirmed, work within international frameworks to reduce releases of such substances.

- U.S. and Canadian Challenge: Complete or be well advanced in remediation of priority sites with contaminated bottom sediments in the Great Lakes Basin by 2006.

Priority Activities

To meet the above challenges, EC and USEPA will implement the four-step analytical framework outlined earlier and will regularly reassess progress being made. Through this framework, the governments will engage key partners, both inside and outside the Basin, in the process of setting more specific milestones and in developing and implementing solutions to achieve those milestones. Where possible, formal or informal agreements may be developed. EC and USEPA will publicly recognize the successful efforts undertaken by all segments of society.

In addition, EC and USEPA will enlist the support of municipalities, industries, product manufacturers and others outside the Basin to assist in meeting the challenges in the Strategy, especially for those substances which may be entering the Great Lakes via long-range transport, consistent with the approaches outlined in the Strategy.

Joint Progress Measurement and Reporting Activities

The following are examples of joint priority Canadian-U.S. activities. EC and USEPA will review these joint projects annually for additions and/or modifications.

It is recognized that, for some of the Level I and II substances, measurement of releases or ambient levels is not always feasible using routine sampling and analytical techniques. EC and USEPA are committed to adopting, where feasible or necessary, a range of indicators from process measurements (e.g., the number of formal or informal agreements entered into with business sectors to achieve specific reductions) to environmental endpoints (e.g., fish contaminant levels) in order to measure progress. Indicators will be identified to address the use, generation, and release of Strategy substances. The Strategy recognizes that the information contributed by our ongoing joint emissions inventory work will be extremely useful in addressing major sources within the jurisdictions bordering the Great Lakes.

To fulfill the implementation requirements of this Strategy and other critical bilateral Great Lakes activities, EC and USEPA will work with federal, state, and provincial departments and agencies, to review, within the context of existing resources, the state of Great Lakes related surveillance and monitoring programs in order to improve their coordination.

EC and USEPA commit jointly to report on progress (including release reductions leading to virtual elimination) under this Strategy at the biennial meeting of SOLEC or another appropriate forum. In addition, EC and USEPA will periodically convene a stakeholder forum to assess progress, identify new opportunities for reductions, and, if appropriate, evaluate the status of the Level I and II substances and refine the challenge milestones. These reporting mechanisms may be modified if necessary.

As well, in order to assess progress toward achieving the above commitments, EC and USEPA will establish a process for determining baseline release levels and loadings of Level I and II substances through a data synthesis and modelling effort, based on best available data and scientific information.

Significant Issues

EC and USEPA will work together to address significant toxic substances-related issues which affect the whole Great Lakes Basin throughout the implementation of this Strategy. These issues will be selected in consultation with our partners. For example, these issues may include the transboundary effects of incineration, the transboundary movement of hazardous wastes and bilateral sector-specific pollution prevention initiatives.

The technical support document (**Attachment 1**) describes more detailed action steps to be undertaken either individually by EC and USEPA, or jointly by both, in conjunction with their partners, to meet each challenge.

Approved by:

Carol Browner
Administrator
U.S. Environmental Protection Agency

Date

Sergio Marchi
Minister of the Environment
Government of Canada

Date

Appendix I

PERSISTENT TOXIC SUBSTANCES FOCUSED ON BY THE *CANADA--UNITED STATES STRATEGY FOR THE VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES IN THE GREAT LAKES*

Level I Substances

Aldrin/dieldrin
Benzo(a)pyrene {B(a)P}
Chlordane
DDT (+DDD+DDE)
Hexachlorobenzene (HCB)
Alkyl-lead
Mercury and mercury compounds
Mirex
Octachlorostyrene
PCBs
PCDD (Dioxins) and PCDF (Furans)
Toxaphene

Level II Substances

Cadmium and cadmium compounds
1,4-dichlorobenzene
3,3'-dichlorobenzidine
Dinitropyrene
Endrin
Heptachlor (+Heptachlor epoxide)
Hexachlorobutadiene (+Hexachloro-1,3-butadiene)
Hexachlorocyclohexane
4,4'-methylenebis(2-chloroaniline)
Pentachlorobenzene
Pentachlorophenol
Tetrachlorobenzene (1,2,3,4- and 1,2,4,5-)
Tributyl tin

Plus PAHs as a group, including but not limited to:

Anthracene
Benzo(a)anthracene
Benzo(g,h,i)perylene
Perylene
Phenanthrene

How Strategy Substances were Selected

Level I Substances

Substances were selected on the basis of their previous nomination to lists relevant to the pollution of the Great Lakes Basin Ecosystem. These included:

- "Bioaccumulative chemicals of concern" (BCCs) from the "*Final Water Quality Guidance for the Great Lakes System,*" USEPA, March 1995;
- Substances identified by the "*Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem* (COA)," 1994;
- Substances identified as critical pollutants by the International Joint Commission (IJC), 1987;
- Substances designated "Lakewide Critical Pollutants" in Lakewide Management Plans (LaMPs);

As a measure of further corroboration for their environmental impact, reference was made to the persistent organic pollutants (POPs) of concern identified in the United Nations Environment Programme Governing Council Decision 18/32 of May 1995, and incorporated into the Council of the Commission for Environmental Cooperation's *Sound Management of Chemicals* Agreement between the U.S., Canada, and Mexico (Resolution #95-5), October 1995.

The intent of the Strategy is to identify and focus efforts on those substances which are persistent and toxic, especially, but not exclusively, those which bioaccumulate. Rather than use a new screening and assessment process, the Strategy seeks to build upon the most recent and relevant science-based selection processes used in either country. These processes considered a wide range of factors such as chemical and physical properties, potential to cause cancer, toxicity, risk to human health and wildlife, presence in the environment, as well as adverse impacts observed in the environment. Asymmetries in the approaches or information used by the two nations, or in definitions of bioaccumulation produced some differences in lists identified by each country. However, because the Strategy is a binational activity, the final list of chemicals was the result of agreement on the nominations from the two countries.

Level I Substances

- aldrin/dieldrin[1,2,3,4,5]
- benzo(a)pyrene[2,3,4]
- chlordane[1,2,4,5]
- DDT (+DDD+DDE) [1,2,3,4,5]
- hexachlorobenzene[1,2,3,4,5]
- Alkyl-lead[2,3,4]
- mercury and compounds[1,2,3,4]
- mirex[1,2,3,4,5]
- octachlorostyrene[1,2,4]
- PCBs[1,2,3,4,5]
- PCDD (Dioxins) and PCDF (Furans)[1,2,3,4,5]
- toxaphene[1,2,3,4,5]

Legend: [1]U.S. BCC
[2]Canadian COA
[3]IJC Critical Pollutant
[4]LaMP Lakewide Critical Pollutant
[5]POPs from CEC Council Resolution #95-5

Level II Substances

Level II substances are those for which one country or the other has grounds to indicate its persistence in the environment, potential for bioaccumulation and toxicity. These grounds have not as yet been sufficiently considered by both nations such that they can agree to set joint challenge goals for these substances at this time. Until and unless these substances are placed on the Level I list, the governments encourage stakeholders to undertake pollution prevention activities to reduce levels in the environment of those substances nominated jointly by both countries, and to conform with the laws and policies of each country with respect to those substances nominated by only one country.

Level II Substances

cadmium and cadmium compounds[2,4]
1,4-dichlorobenzene[2]
3,3'-dichlorobenzidine[2]
dinitropyrene[2]
endrin[5]
heptachlor (and heptachlor epoxide)[5]
hexachlorobutadiene and hexachloro-1,3-butadiene[1]
hexachlorocyclohexane [1,2,4,6]
4,4'-methylenebis(2-chloroaniline)[2]
pentachlorobenzene[1]
pentachlorophenol[2]
tetrachlorobenzene (1,2,3,4- and 1,2,4,5-)[1]
tributyl tin[2]
PAHs as a group, including anthracene, benzo(a)anthracene, benzo(ghi)perylene, perylene, and phenanthrene[2]

Legend:[1]U.S. BCC
[2]Canadian COA
[3]IJC Critical Pollutant
[4]LaMP Lakewide Critical Pollutant
[5]POPs from CEC Council Resolution #95-5
[6]In Canada, all agricultural pesticides were excluded from the COA Tier II list and are dealt with separately under COA and are not Canadian nominations to this list.

Future Changes in the Chemical Listing Process

USEPA and EC intend to consult with stakeholders on proposed changes to the lists at the biennial meeting of SOLEC or another appropriate forum. Existing processes for nominating or elevating substances will be used e.g., BCCs in the U.S., TSMP, and COA in Canada, or LaMP Critical Pollutants. It is not the intent of the Strategy to initiate a new nominating process. Existing nominating and chemical screening processes already include a strong public participation component.

The two nations will share information regarding the persistence, bioaccumulation potential, and toxicity of Level II substances. If a substance meets Level I criteria, the two countries will set binational virtual elimination challenges for it. Elevation to Level I or removal of a substance from Level II will be made with appropriate opportunity for public review and comment.

ACTIONS UNDER THE BINATIONAL STRATEGY

For the U.S.[3], the baseline from which reductions will be measured in most cases is the most recent and appropriate inventory. In the case of mercury, for example, the most recent inventory is based on estimated emissions during the early 1990s. For Canada, the baseline is defined by a 1988 emissions inventory based on the ARET program.

Canada recognizes that the GLWQA remains in perpetuity while COA expires in 2000. At that time, Canada and Ontario will review progress and assess what further steps would be required to ensure that Canada's obligations under the GLWQA and the Strategy are being met.

The following list of activities is not meant to be exhaustive or comprehensive; rather, it is illustrative of the many activities currently taking place or expected to take place. We understand that the states, Tribes, the Province of Ontario, First Nations, and Great Lakes stakeholders are undertaking many additional actions to achieve toxic reductions. For purposes of brevity, we have listed selected actions only.

U.S. Challenge: Confirm by 1998 that there is no longer use or release from sources that enter the Great Lakes Basin of five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), and of the industrial byproduct/contaminant octachlorostyrene. If ongoing, long-range sources of these substances from outside of the U.S. are confirmed, work within international frameworks to reduce or phase out releases of these substances.

Canadian Challenge: Report by 1997, that there is no longer use, generation or release from Ontario sources that enter the Great Lakes of five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), and of the industrial byproduct/contaminant octachlorostyrene. If ongoing, long-range sources of these substances from outside of Canada are confirmed, work within international frameworks to reduce or phase out releases of these substances.

- EC and USEPA will continue to support Great Lakes watershed "clean sweeps," which receive unwanted and hazardous agricultural chemicals for appropriate disposal. These programs have previously received sizeable quantities of these pesticides.

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[3] When developing the Strategy and the reduction targets, the U.S. started with the presumption that releases of the Level I substances could be reduced by roughly an order of magnitude (90 percent) by 2006. Early drafts of the Strategy contained this goal. However, analysis of baseline emissions inventories has shown in some cases that reductions of this level may not be practical from a technical or economic standpoint. For instance, an analysis of U.S. mercury emissions shows that even a considerable regulatory and pollution prevention effort is unlikely to result in reductions of 90 percent between 1991 and 2006. However, a reduction of roughly one-half from the emissions levels in the most recent mercury emissions inventory is believed to be feasible. Thus, the U.S. challenge in the binational Strategy sets a goal of 50 percent reduction in mercury emissions by 2006.

- EC and USEPA will undertake actions to verify that these five pesticides are no longer used or released in the Great Lakes watershed, based on the weight of evidence from use and environmental monitoring data. EC will also undertake actions to verify no commercial production, use or importation of these five pesticides in the Great Lakes watershed, based on the weight of evidence from use and environmental monitoring data. In the U.S., it is recognized that there may be continued legal use of some of these cancelled pesticides; the goal is to encourage decreased use of these products. In addition, alternative methods of disposal are encouraged.

- EC and USEPA will verify that octachlorostyrene (OCS) is no longer deliberately released to the Great Lakes watershed; efforts to eliminate OCS formation as a byproduct will be promoted.

- If ongoing local sources of toxaphene in Lakes Superior and Michigan are confirmed, undertake appropriate actions to seek reductions. If ongoing long-range sources of toxaphene are confirmed, work within international frameworks to reduce or phase out releases of the substance.

    - Assess and pursue recommendations from the joint U.S.-Canada technical workshop on toxaphene in the Great Lakes, held in Spring 1996.

    - EC and USEPA will develop and implement a joint monitoring plan through the LaMP monitoring committee to track toxaphene levels in Lake Superior. Monitoring of toxaphene in Lake Michigan and the high Arctic will be integrated with Lake Superior monitoring to track reductions in this class of pollutant.

In the United States:

- USEPA will work with stakeholders to reduce reliance on high-risk pesticides and to promote wider use of biointensive Integrated Pest Management. Additionally, USEPA will work with the states to help incorporate such concepts in the development of their State Management Plans (SMPs) to protect ground water from pesticide contamination.

In Canada:

Registration of chlordane, aldrin/dieldrin, DDT and toxaphene was voluntarily discontinued by the registrants. Mirex was never registered as a pest control product in Canada.

- The federal Pest Management Regulatory Agency (PMRA) is working with stakeholders on risk reduction strategies and to support the implementation and use of sustainable pest management strategies such as integrated pest management. Partners in these initiatives include provincial governments, both regulatory and extension programs, pesticide manufacturers, researchers, federal government departments, grower and trade associations, and environmental groups.

U.S. Challenge: Confirm by 1998, that there is no longer use of alkyl-lead in automotive gasoline. Support and encourage stakeholder efforts to reduce alkyl-lead releases from other sources.

Canadian Challenge: Seek by 2000, a 90 percent reduction in use, generation, or release of alkyl-lead consistent with the 1994 COA.

In the United States:

- In concert with stakeholders, investigate measures to reduce alkyl-lead from other sources.

In Canada:

- Provincial monitoring programs indicate a 96 percent decline in atmospheric lead levels to date.

- It is estimated that releases of alkyl-lead (1,000 kg/yr) in Ontario are almost entirely from aviation fuel. Minor generation through industrial or mining processes utilizing lead is possible and will be investigated. Elimination of alkyl-lead in aviation fuel will be investigated in partnership with responsible sources.

U.S. Challenge: Seek by 2006, a 90 percent reduction nationally of high-level PCBs (>500 ppm) used in electrical equipment. Ensure that all PCBs retired from use are properly managed and disposed of to prevent accidental releases within or to the Great Lakes Basin.

Canadian Challenge: Seek by 2000, a 90 percent reduction of high-level PCBs (>1 percent PCBs) that were once, or are currently, in service and accelerate destruction of stored high-level PCB wastes which have the potential to enter the Great Lakes Basin, consistent with the 1994 COA.

In the United States:

PCB production was banned in the U.S. in 1977; certain uses were banned while other existing PCBs could be used for the remainder of their useful, economic life. The most significant remaining use of high- and low-level PCBs is in electrical equipment. These PCBs may pose risk due to the potential for spills. This challenge goal is targeted at increasing the pace of removal of high-level PCBs in electrical equipment so as to minimize the risk of releases to the environment. The challenge goal takes into account the usual process of retiring or decommissioning electrical equipment.

Transformers: Reductions will be measured using as a baseline the estimated 200,000 transformers containing high-level PCBs in use in 1994. This figure includes an estimate of the transformers containing intentionally manufactured PCBs, or askarel, and an estimate of the transformers containing mineral oil dielectric fluid contaminated to concentrations greater than 500 ppm. In striving to reduce the number of transformers containing high-level PCBs, USEPA will also strive to reduce the number of transformers containing low-level PCBs.

Capacitors: Reductions will be measured using as a baseline the estimated 1,473,000 capacitors containing high-level PCBs in use in 1994.

The U.S. has already achieved substantial reductions in the amount of PCB wastes in existence within its borders. On a national basis, the U.S. disposed of (i.e., destroyed) 3.4 billion kilograms of PCB wastes during 1990-94. In addition, a number of Great Lakes electric utilities have already removed almost 90 percent of the PCBs that they once had in service. However, there are many facilities whose electrical equipment contains PCBs. Progress toward phase down at these facilities is unknown; this goal seeks the voluntary accelerated phase down of remaining high- and low-level PCBs at these facilities. Concurrently, as described elsewhere in this Strategy, USEPA will continue ongoing cleanup activities involving sediment contaminated with PCBs.

- U.S. progress in relation to this objective will be measured based upon data submitted to EPA regarding PCB removals from service and PCB wastes destroyed.

- The U.S. aim is to promote accelerated removal of PCBs on a voluntary basis, with an emphasis on high-level PCBs (those >500ppm) in electrical equipment, while ensuring compliance with present management requirements for PCBs that may be used indefinitely. In addressing this challenge, USEPA will give priority to sources in areas with the greatest potential to affect the Basin.

- USEPA will finalize the PCB Disposal Amendments, proposed in 1994 (50 FR 62788-62877, December 6, 1994), which aim to reduce disposal costs through reduced administrative requirements for, and self implementation of, certain activities, including the decontamination (of equipment and materials) and disposal of PCBs.

- USEPA, in cooperation with Great Lakes states, may consult with potential users of PCBs such as utilities, government facilities, commercial buildings, and manufacturing facilities, including pulp and paper mills, steel mills, aluminum smelters, and transformer rebuilders, and request their accelerated removal of high-level PCBs (those >500 ppm) from use.

- USEPA will, through the issuance of grants, promote activities involving the collection of information on the use, release, disposal or environmental levels of PCBs at any concentration.

- USEPA will finalize the Reclassification of PCB and PCB Contaminated Transformer Rule, proposed in the Federal Register of November 18, 1993, which aims to reduce the regulatory and economic burdens associated with reclassifying electrical equipment by amending reclassification requirements.

- USEPA will request that efforts promoting the reduction of PCBs be included in cooperative agreements with states.

In Canada:

- Over 40 percent of Ontario's high-level PCBs have been decommissioned. Continued efforts to decommission the remaining PCBs to meet the 90 percent target will be pursued in conjunction with owners and interested stakeholders, with a goal of "one-stop decommissioning and destruction" where possible.

- The target for PCB destruction applies to the 18,614 tonnes of high-level PCB wastes now in storage; 1300 tonnes have been destroyed as of December 1995. Demonstrations of new technologies for PCB destruction are being undertaken, in partnership with PCB owners across Ontario. Consolidation of small quantities for destruction, and decontamination to reduce storage/destruction volumes, is being considered.

- New federal regulations, effective February 1997, permit Canadian PCB wastes to be exported to the U.S. for destruction under strict environmental controls. These new controls will expedite the elimination of existing Canadian PCB wastes presently in storage.

- Significant progress is being made by the federal government on the decommissioning and destruction of federally-owned PCBs in the Great Lakes watershed. Over 50 percent of federally-owned PCBs have been decommissioned and destroyed. Work continues by federal government departments on the decommissioning and destruction of their remaining inventories.

U.S. Challenge: Seek by 2006, a 50 percent reduction nationally in the deliberate use of mercury and a 50 percent reduction in the release of mercury from sources resulting from human activity. The release challenge will apply to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin. This challenge is considered an interim reduction target and, in consultation with stakeholders, will be revised if warranted, following completion of the Mercury Study Report to Congress.

Canadian Challenge: Seek by 2000, a 90 percent reduction in the release of mercury, or where warranted the use of mercury, from polluting sources resulting from human activity in the Great Lakes Basin. This target is considered as an interim reduction target and, in consultation with stakeholders in the Great Lakes Basin, will be revised if warranted, following completion of the 1997 COA review of mercury use, generation, and release from Ontario sources.

Through the Lake Superior Binational Program, Canada and the U.S., along with Ontario, Michigan, Minnesota and Wisconsin, have begun implementing a zero discharge demonstration project for mercury. A use-source tree for mercury was developed, and emission estimates generated. Strategies for reducing mercury emissions to "zero" are being developed in consultation with the Lake Superior Binational Forum. The Forum has provided recommendations to the governments consisting of a timeline for achieving zero discharge of mercury.

In the United States:

The primary remaining source of mercury in the Great Lakes ecosystem is atmospheric deposition of mercury emissions, often transported over long distances. The U.S. is using the most recent mercury emissions inventory, i.e., that which was conducted during the early 1990s, to measure reductions. This inventory suggests that the U.S. currently releases about 200 tons of mercury to the atmosphere annually. Standards for municipal waste combustors (which have been finalized for major sources and which will be re-promulgated for minor sources) and medical waste incinerators (proposed) will, when implemented by 2002, provide about a 70 ton reduction in mercury emissions, or 35 percent of current total U.S. emissions. Implementation of other Maximum Available Control Technology (MACT) standards offers the probability of further mercury emission reductions, though these cannot be estimated prior to their development. Direct controls on emissions will be complemented by the promotion of innovative technologies to reduce use and increase recycling, in order to reduce the amount of mercury entering the incinerator waste stream. Increased consumption of fossil fuels may, however, increase mercury emissions in the future. The U.S. has reduced mercury use 75 percent during the past 15 years, most of which has occurred since 1988. Given a 30-year trend away from mercury use in the U.S., it is expected that companies will continue to develop and market mercury-free alternatives as was done with alkaline batteries. Chlorine production, for example, is the largest national use of mercury. However, as new chlorine production plants are built, this industry is shifting from the mercury cell process to successor technologies which avoid the use of mercury. USEPA expects to release its Mercury Report to Congress in 1998.

- With the assistance of the Great Lakes states and others, USEPA will consult with potential users and releasers to seek their commitment to release and use reduction targets. Several Great Lakes states have mercury task forces which are working with stakeholders to undertake innovative mercury pollution prevention activities.

- USEPA and their Great Lakes state partners propose to include mercury release and use reduction as a goal to be included in the Performance Partnership Process, giving each state the opportunity to fund state-specific mercury projects, reflective of priorities in each state.

- USEPA will seek the assistance and cooperation of the Great Lakes states to target one or two specific sectors to undertake a major voluntary effort to reduce emissions and releases.

- USEPA will explore innovative approaches to reduce mercury, e.g., labelling requirements, reductions in use in non-essential items, or through product substitutions.

- USEPA will help strengthen and streamline federal/state coordination of mercury reduction activities by inviting participation in national mercury initiatives, and by helping to convene periodic Great Lakes meetings or symposia on mercury reduction activities, including state mercury reduction legislative initiatives, private sector actions, and other innovative projects.

- USEPA has promulgated standards for municipal waste combustors and proposed standards for medical waste incinerators.

- USEPA is developing rules for hazardous waste incinerators and cement kilns which burn hazardous wastes. Implementation of these rules should reduce mercury emissions from these sectors.

- USEPA expects that this challenge can be met primarily through existing and proposed regulations of municipal waste combustors and medical waste incinerators, supplemented by voluntary initiatives. USEPA does not expect this challenge to require new regulatory initiatives. In addressing this challenge, USEPA will give priority to sources in areas with the greatest potential to affect the Basin.

- Implementation of Clean Air Act provisions which apply to other sectors which emit mercury may provide further reductions; it is not possible, however, to estimate resulting reductions, prior to development of these standards.

- The U.S. federal government (DOD, EPA) will study alternatives to the sale of surplus mercury from DOD stockpiles. The U.S. government holds 11.5 million pounds of mercury, which made it one of the world's principal suppliers before sales were suspended in 1994, pending review of environmental implications.

- USEPA will study alternatives to the incineration option for treatment of organomercuric hazardous wastes.

In Canada:

- It has been estimated that between 2,700 and 3,450 kg of mercury are released to the atmosphere in Ontario annually from anthropogenic sources, while up to 2,500 kg are released to the waters of the Great Lakes Basin annually. Through an analysis of mercury uses and sources, significant sources of mercury have been identified and prioritized. These sources will be encouraged to develop strategies to reduce their releases by 90 percent from a baseline year of 1988 through adoption of pollution prevention measures.

- In partnership with Pollution Probe, Canada and Ontario have identified potential industrial partners to participate in a unique three-way initiative to reduce or eliminate mercury in industrial or commercial applications. Coordination of this effort with U.S. partners is being considered, and the findings and approaches are being shared with the U.S. Virtual Elimination Pilot Project.

- Activities by companies to date have resulted in significant reductions in mercury content in batteries (60 - 90 percent), fluorescent lamps (44 percent) and switches, while further reductions are planned, such as 70 percent by fluorescent lamp manufacturers by 2000. One impact of past mercury usage is that landfill emissions may be a source of mercury releases in the Great Lakes Basin, but the quantities released and possible control mechanisms need further consideration.

- In applying the analytical framework in addressing mercury, relevant information from research projects undertaken by Environment Canada, Natural Resources Canada, and other agencies will be considered.

- Canada will work with the U.S. and Mexico in implementing the North American Regional Action Plan for Mercury and will incorporate mercury reduction targets in its partnerships with commercial and industrial sectors in Ontario.

U.S. Challenge: Seek by 2006, a 75 percent reduction in total releases of dioxins and furans (2,3,7,8-TCDD toxicity equivalents) from sources resulting from human activity. This challenge will apply to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin. Seek by 2006, reductions in releases, that are within, or have the potential to enter the Great Lakes Basin, of HCB and B(a)P from sources resulting from human activity.

Canadian Challenge: Seek by 2000, a 90 percent reduction in releases of dioxins, furans, HCB, and B(a)P, from sources resulting from human activity in the Great Lakes Basin, consistent with the 1994 COA. Actions will focus on the 2,3,7,8 substitute congeners of dioxins and furans in a manner consistent with the TSMP.

Through the Lake Superior Binational Program, Canada and the U.S., along with Ontario, Michigan, Minnesota and Wisconsin, have begun implementing a zero discharge demonstration project for dioxins, furans, HCB and octachlorostyrene. Analysis of uses and sources for these pollutants were developed as were emission estimates. Strategies for reducing emissions to "zero" are being developed in consultation with the Lake Superior Binational Forum. The Forum has provided recommendations to the governments consisting of timelines for achieving zero discharge of critical pollutants.

In the United States:

USEPA will use its September 1994 draft dioxin Reassessment as an interim baseline for calculating dioxin emission reductions. Once USEPA has completed and released its final dioxin Reassessment, it will use the Reassessment's emissions inventory for 1987 as the challenge baseline. In the draft Reassessment, USEPA estimated that total releases to air from all sources is 9300 grams/annually, with 5100 grams from medical waste incinerators (55 percent) and 3000 grams from municipal waste incinerators (32 percent). Over a dozen sources make up the remaining 1200 grams.

- USEPA will complete its re-evaluation of the hazards presented by dioxin, as outlined in the draft Reassessment report released during 1994 for public comment. The Agency will also complete a policy assessment of dioxin, anticipated to be finalized with the release of the Final Reassessment.

- USEPA has promulgated standards for major source municipal waste combustors, and will finalize standards for medical waste incinerators and for minor source municipal waste combustors. These combustors and incinerators are regarded as significant sources of dioxins and furans; these substances are inadvertent by-products of combustion. Implementation of these standards is anticipated to reduce releases of dioxins from these sectors by more than 75 percent by 2006.

- Sizable reductions in HCB emissions are anticipated from municipal waste combustors and from cement kilns that burn hazardous wastes. Improvement for incineration of HCB-contaminated waste is also likely. Current information does not yet provide support for a more specific reduction challenge but as soon as data are available, a target will be included.

- Since current information does not yet provide support for a more specific reduction challenge for B(a)P, the U.S. will continue efforts to identify and quantify emissions of PAHs (and B(a)P in particular). Used oil re-refining may reduce the amount of B(a)P released to the environment.

In Canada:

Significant progress has been made in meeting this challenge under the COA and related activities such as the ARET program. This trend will be further promoted in partnerships focusing on priority sources of these pollutants. Implementation of the federal government's TSMP will facilitate additional cooperative actions in these and other sectors, consistent with the mandates of the different federal departments.

- Preliminary Ontario release estimates for B(a)P, HCB, dioxins and furans suggest more than 90 percent of the releases are direct atmospheric releases. A substantial natural emission of B(a)P may also be present from forest

fires, complicating analysis of environmental trends in this contaminant. This analysis has identified and prioritized sources of these pollutants for subsequent development of reduction strategies.

- Through ARET, participating companies have reported reductions in emissions of HCB of 80 percent and of dioxins and furans of 98 - 99 percent. Through pollution prevention, participating companies reported 4,300 tonnes of hydrocarbon emissions and 16,000 tonnes of other waste emissions reduced. Participation and reporting of reductions undertaken voluntarily is growing in the Canadian portion of the Great Lakes Basin, signalling a trend away from controls and treatment toward eliminating use and generation.

- Both Canada and Ontario have promulgated stringent effluent requirements for the pulp and paper sector and pulp mills have invested heavily in the past five years to achieve compliance with the regulations. Canada and Ontario will confirm in 1997 that all mills using chlorine-based bleaching are in full compliance with the "non-measurable" effluent concentration requirements and have virtually eliminated dioxins and furans from their effluent.

- Dioxins, furans, and HCB have been assessed and declared toxic under the Canadian Environmental Protection Act. HCB and the 2,3,7,8 substituted congeners of dioxins and furans are proposed for management on a national level under Track I (virtual elimination) of the TSMP. A federal/provincial task force is being established to evaluate control options for dioxins and furans and a multistakeholder group will also be established soon to develop options for HCB. Similarly, control options for polycyclic aromatic hydrocarbons (PAHs) including B(a)P are being developed for the major source sectors such as iron and steel and wood preservation.

- Registration of HCB as a fungicidal seed treatment has been discontinued in Canada since 1976, and uses of HCB as a pesticide are considered illegal under the Pest Control Products Act.

- In lifting its ban on new municipal waste incinerators, Ontario has adopted emissions limits at least as stringent as the MACT standards adopted in the U.S.

U.S. and Canadian Challenge: Promote pollution prevention and the sound management of Level II substances, to reduce levels in the environment of those substances nominated jointly by both countries, and to conform with the laws and policies of each country, including pollution prevention, with respect to those substances nominated by only one country. Increase knowledge on sources and environmental levels of these substances.

In Canada, the federal government will manage Level II substances consistent with federal legislation, the TSMP and COA.

- EC and USEPA will investigate levels of these contaminants in the Great Lakes where appropriate and, where possible, gather additional information on resulting impacts to the ecosystem.

- EC and USEPA will also continue to inventory emissions of selected substances and model their loading to the Great Lakes.

- EC will develop information on the occurrence, fate and effects of organometal compounds (including tributyl tin).

- EC will also upgrade and improve public access to an existing import/export information database concerning imports/exports of hazardous waste.

- Implementation of the Clean Air Act in the U.S. will substantially reduce emissions of PAHs.

U.S. and Canadian Challenge: Assess atmospheric inputs of Strategy substances to the Great Lakes. The aim of this effort is to evaluate and report jointly on the contribution and significance of long-range transport of

Strategy substances from world-wide sources. If ongoing long-range sources are confirmed, work within international frameworks to reduce releases of such substances.

- EC and USEPA will, as a priority, coordinate efforts to identify sources of atmospheric pollutants in order to better define and coordinate emission control programs.

- EC and USEPA will maintain atmospheric deposition monitoring stations to detect deposition and transport of Strategy substances.

- EC and USEPA will continue research on the atmospheric science of toxic pollutants to refine and improve existing source, receptor and deposition models, fundamental to impact assessment. They will also improve integration of existing air toxic monitoring networks and data management systems to track deposition of contaminants within the Great Lakes.

- EC and USEPA will conduct an assessment of the long-range transport of persistent toxic substances from world-wide sources.

- By 1999, Canada will complete inventories of 10 selected air pollution sources to support assessment of the environmental impacts of air toxics. In addition, by 2001, EC will demonstrate alternative processes to lessen emissions from 5 predominant sources.

U.S. and Canadian Challenge: Complete or be well advanced in remediation of priority sites with contaminated bottom sediments in the Great Lakes Basin by 2006.

In the United States:

- The Assessment and Remediation of Contaminated Sediments (ARCS) Program, a five-year study/demonstration project relating to the assessment and treatment of toxic pollutants from bottom sediments, has been undertaken.

- Continue ongoing contaminated sediment cleanup activities in the following AOCs as well as other priority areas: Ashtabula Harbor, Ohio; Erie Canal at Lockport, New York, Fox River, Wisconsin; Grand Calumet River, Indiana; Kalamazoo River, Michigan; Manistique River, Michigan; Niagara River, New York; Ottawa River, Ohio; River Raisin, Michigan; Rouge River, Michigan; Sheboygan River, Wisconsin; and St. Lawrence River, New York.

- Continue to assess and develop remediation plans for AOCs, and other contaminated sites.

In Canada:

- Document the evaluation and assessment of 250 innovative technologies developed under the auspices of the Great Lakes 2000 Cleanup Fund for the safe handling and treatment of contaminated sediments.

- Promote, on a pilot basis, the application and use of a computerized, searchable and user-friendly Sediment Technology Directory (SEDTEC) of 250 technologies for the handling and treatment of sediments, soils, and sludges.

- Describe effects and appropriate remediation measures, working to ensure cleanup of priority contaminated sediments such as in Thunder Bay, Sault Ste. Marie, Hamilton Harbour, and Port Hope.

- Develop long-term approaches to remediate intermediate contamination such as in Jackfish Bay, Metro Toronto, and Cornwall.

EC and USEPA will encourage and support voluntary programs by industries to reduce the generation, use, or release of targeted contaminants.

- Continue or establish partnerships with key Great Lakes industries (e.g., automotive, printing) to foster "cleaner, cheaper, smarter" ways of preventing or reducing pollution. Examples include Project XL and ISO 14000.

- Pollution prevention programs will be promoted and encouraged at targeted industrial facilities discharging to the Great Lakes using a variety of ongoing efforts, including within Canada, the Pollution Prevention Pledge Program for Ontario and ARET. Within the U.S., the Common Sense Initiative and other programs will support this action.

GLOSSARY

The following definitions are for purposes of this Strategy only.

Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA): Canada and Ontario have entered into an agreement in 1994 to renew and strengthen federal-provincial planning, cooperation and coordination in implementing actions to restore and protect the ecosystem, to prevent and control pollution into the ecosystem, and to conserve species, populations and habitats in the Great Lakes Basin Ecosystem. Implementation of this agreement contributes substantially to meeting Canada's obligations under the 1987 GLWQA.

Great Lakes Basin: The Great Lakes Basin means all of the streams, rivers, lakes and other bodies of water that are within the drainage basin of the St. Lawrence River at or upstream from the point at which this river becomes the international boundary between Canada and the U.S., as defined by the 1987 GLWQA.

Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987:
An agreement between the U.S. and Canada to restore and maintain the chemical, physical, and biological integrity of the water of the Great Lakes Basin Ecosystem.

Life cycle: Consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to the final disposal.

Persistent Toxic Substances: Those substances which have a long half-life in the environment. Substances identified in the Strategy have been nominated from multiple selection processes. It is recognized that there are different definitions of persistence which are used in the various U.S. and Canadian domestic programs.

Release: A release is any introduction of a toxic chemical to the environment as a result of human activity. This includes emissions to the air; discharges from point and non-point sources to bodies of water; introductions to land, including spills or leaks from waste piles, contained disposal into underground injection wells, or other sources.

Resulting from human activity: Any and all sources resulting from human activity, including but not limited to releases from industrial or energy-producing processes, landfilling or other actions.

Toxic Substance: "Any substance which can cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological or reproductive malfunctions or physical deformities in any organism or its offspring, or which can become poisonous after concentration in the food chain or in combination with other substances." Source: 1987 GLWQA