



AUG 19 1996



COOPERATING TO IMPLEMENT THE GREAT LAKES WATER QUALITY AGREEMENT MISE EN OEUVRE DE L'ACCORD SUR LA QUALITÉ DE L'EAU DES GRANDS LACS

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

Purpose

In keeping with the objective of the revised *Great Lakes Water Quality Agreement, as amended by Protocol signed November 18, 1987* (1987 GLWQA), to restore and protect the Great Lakes, the purpose of this binational strategy is to set forth a collaborative process by which Environment Canada (EC) and the United States Environmental Protection Agency (USEPA), in consultation with Great Lakes states and provincial governments, 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. An underlying tenet of this Strategy is that the governments cannot by their actions alone achieve the goal of virtual elimination; all sectors of society must 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 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 and the province of Ontario, and other federal departments and agencies in Canada and the United States.

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% 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 revised GLWQA), the United States and Canada pledged to seek the virtual elimination of the discharge of persistent toxic substances to the Great Lakes.

4905 Dufferin Street
Downsview (Toronto)
Ontario M3H 5T4
Canada

1
ENVIRONNEMENT CANADA

4905, rue Dufferin
Downsview (Toronto)
Ontario M3H 5T4
Canada

1
ENVIRONMENTAL PROTECTION AGENCY

Great Lakes National Program Office
77 West Jackson Blvd.
Chicago, Illinois 60604
U.S.A.

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).

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 and Lakewide Management Plans (LaMPs) for critical pollutants.

In 1991, in response to a recommendation from the IJC, the governments of Canada, the United States, 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, the final U.S. Great Lakes Water Quality Guidance (GLI) for the Great Lakes was published, establishing consistent water quality standards across the Great Lakes system. The Strategy builds on and complements all of these efforts.

Significant successes in reducing toxic substances in the Great Lakes include reduced levels of PCBs, dioxins and DDT, cleanup of contaminated sediment sites at Great Lakes harbors, and improved sport fisheries. However, even given the important accomplishments in toxics reduction achieved by the RAPs, LaMPs, Niagara River DOI and the Binational Program over the past two decades and the actions taken by both countries to ban, cancel, and restrict the use of a number of persistent toxic substances, these chemicals continue to be present in the Great Lakes ecosystem. Levels of PCBs remain unacceptable and require continued issuance of public health advisories regarding fish consumption across the entire Great Lakes system. Mercury contamination also triggers many fish consumption advisories, suppressing the economic potential of the region's fisheries industries. Levels of toxaphene contamination may be increasing in Lakes Superior and Michigan; revised health protection standards for toxaphene led the Province of Ontario to issue fish consumption advisories for several Lake Superior species. The continuing presence of these substances is primarily the result of release from contaminated bottom sediments (e.g., PCBs, mercury), atmospheric deposition of combustion byproducts (e.g., dioxins, B(a)P, mercury), and undetected releases from various processes (e.g., PCBs, B(a)P, hexachlorobenzene). In some cases, there may also be illegal or accidental discharge of stored substances for which production and use has previously been banned (e.g., pesticides).

In addition, there is now increased understanding that the atmosphere is a principal pathway by which many pollutants reach surface waters such as the Great Lakes. Contaminated bottom sediments pollute certain harbors, impeding navigational dredging and the economic potential for use of these waters. In Canada, the Great Lakes 2000 Cleanup Fund has been evaluating over 250 technologies to safely remove and treat contaminated sediments. In the U.S. the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and other regulatory programs have addressed some of these problems, but more needs to be done. There is growing public concern about, and active government investigation into, toxic pollutants that may produce non-cancerous human health effects, including reproductive and hormonal disruption, and learning disabilities.

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/Area of Concern to the lakewide, basinwide, national, and international arenas. Movement of persistent toxic substances does not respect jurisdictional or geographic borders. In particular, the interbasin transfer of persistent toxic substances from one lake to another and the short- and long- range movement and deposition of these chemicals from the air compel EC and USEPA to develop a coordinated Binational Virtual Elimination Strategy.

The Strategy is intended to fill in the gaps which exist where ongoing programs or emerging initiatives do not 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

The 1987 GLWQA commits the two countries to seek to "virtually eliminate" the discharge of persistent toxic substances in the Great Lakes ecosystem. 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, and the U.S. through its Virtual Elimination Pilot Project.

In February 1995, Prime Minister Chretien 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 draft, building on past and ongoing virtual elimination efforts in the Basin, including the extensive work by the IJC in their 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 lifecycle 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

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; some may persist at low background levels. In addition, total or complete elimination may not be possible for technological reasons. To accomplish the objective of restoring and maintaining the integrity of the Great Lakes, the Strategy seeks to reduce and virtually eliminate the use, generation or release of persistent toxic substances resulting from human activity. 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 phaseouts and bans.

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 identified in this document will evolve over time as information about opportunities becomes known, and that additional approaches and actions will be identified. Virtual elimination may not be achievable tomorrow, but the challenges and actions outlined in this Strategy represent tangible 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 nonpoint, within and outside the Basin which release the selected chemicals, by economic sector. Within each source, identify why and how the substance is used or released (used as a product, released as a byproduct, etc.) This step may include examining the entire lifecycle of the substance, from initial decision to use through eventual disposal.

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

Assess how existing laws, regulations and programs influence the use and release of these substances across states, provinces, regions and international borders. Identify the gaps in these regulations, programs and initiatives that offer opportunity for the most effective reduction in use, generation or release.

3. Identify cost-effective options to achieve further reductions

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

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

Recommend and implement actions that work toward the goal of virtual elimination, using cost-effective measures.

With respect to some substances, EC and USEPA already have 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 United States 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 persistent toxic substances, especially those which bioaccumulate, 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, our two nations cannot protect our citizens solely through bilateral actions. We will work with other nations to share scientific information, assist them in their environmental decisions and work with them toward international accords to reduce these substances, including in the context of the new North American Resolution on the Sound Management of Chemicals under the North American Agreement for Environmental Cooperation; the development of protocols to the United Nations Economic Commission for Europe (UNECE)/Convention on Long Range Transboundary Air Pollution (LRTAP) relating to persistent organic pollutants (POPs) and heavy metals; and anticipated multilateral negotiations on POPs.
- 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 will evolve over time as information about opportunities becomes available. EC and USEPA at all times are free 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.
- favour "cleaner, cheaper and smarter" ways to reduce persistent toxic substances, focusing on the strongest opportunities across a substance's life cycle, and applying to all sources and pathways, 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 substances as a complement to regulatory initiatives.

Scope

Recognizing that virtual elimination is a long-term objective, this Strategy provides a framework to achieve specific actions from 1996 to 2005. These actions and goals represent milestones along the path to virtual elimination. This Strategy embraces actions to reduce and virtually eliminate the use, generation, or release of persistent toxic substances resulting from human activity, particularly those which bioaccumulate, that affect or have the potential to affect the Great Lakes ecosystem.

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, the traditional concept of the geographic area which impacts the Basin will be expanded to include a national, or other appropriate, scale since the long-range transport of these pollutants adversely affects the water quality of the Lakes.

To facilitate the reductions, EC and USEPA will work in cooperation with other responsible jurisdictions on a national and international basis to achieve contributions to the goals of the Strategy, by strengthening linkages to all existing toxics reduction efforts to ensure that goals are harmonized and actions are coordinated to achieve environmental progress.

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 persistent toxic 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 Lakewide Management Plans (LaMPs) and the Remedial Action Plans (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 and 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 ensuring 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 the IJC, or that have been designated as "critical pollutants" by the Lakewide Management Plans (see "Level I" substances -- **Appendix I**). In essence, these are chemicals 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 represent the "bullseye" around which the governments will focus and lead actions and efforts. Since these substances have been associated with or have the immediate 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 voluntary or regulatory, incentive-based actions that phase out the use, generation or release of these chemicals in a cost-effective manner within the most expedient time-frame.

The Strategy also includes actions for a second set of chemicals ("Level II" substances -- **Appendix I**) that have the potential for significantly impacting the Great Lakes ecosystem through their use and/or release. These substances are also targeted for voluntary actions; stakeholders are strongly encouraged to undertake

preventative measures to achieve significant reductions in the use and release of these substances to the environment.

On a biennial basis, EC, USEPA and their partners will assess and evaluate progress under the Strategy during the State of the Lakes Ecosystem Conference (SOLEC). In addition, EC and USEPA in cooperation with their partners will examine the chemicals addressed by the Strategy to determine whether any Level II chemicals should be elevated to the Level I list. Also at this time, new chemicals which present threats to the Great Lakes ecosystem will be considered for inclusion on the Level I or II lists.

Challenges

EC and USEPA, working in cooperation with their partners, accept the following challenges as tangible 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 anticipated regulatory actions under current 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 United States, the baseline from which reductions will be measured is unique for each chemical, 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 become available, EC and USEPA may revise the milestones, using a public consultation process involving their partners. In some cases, percent reductions may differ between EC and the 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. and Canadian Challenge:** Confirm by 1997, that there is no longer use, generation 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 octachlorostyrene. If ongoing, long-range sources of these substances from outside of the United States and Canada are confirmed, work within existing international framework to reduce or phase out releases of the substances.
- **U.S. Challenge:** Confirm by 1997, that there is no longer use of alkyl-lead in automotive gasoline; reduce or replace by 2005, alkyl-lead in aviation fuel.
Canadian Challenge: Seek by 2000, a 90% reduction in use, generation, or release of alkyl-lead consistent with the 1994 COA.
- **U.S. Challenge:** Seek by 2005, a 90 percent reduction nationally of high level PCBs (>500 ppm) used in electrical equipment.
Canadian Challenge: Seek by 2000, a 90 percent reduction of high level (>50 ppm) 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.
- **U.S. Challenge:** Seek by 2005, a 50 percent reduction nationally in the deliberate use and a 50 percent reduction nationally in the release of mercury from sources resulting from human activity.

Canadian Challenge: Seek by 2000, a 90 percent reduction in the use, generation or release of mercury from sources resulting from human activity that enter the Basin, consistent with the 1994 COA.

- U.S. Challenge: Seek by 2005, a 75 percent reduction nationally in total releases of dioxins and furans from sources resulting from human activity. Seek by 2005, reductions nationally in releases of Hexachlorobenzene and B(a)P from sources resulting from human activity.
Canadian Challenge: Seek by 2000, a 90 percent reduction in releases of furans, hexachlorobenzene, B(a)P, and dioxins, from sources resulting from human activity that enter the Great Lakes Basin, consistent with the 1994 COA.
- U.S. and Canadian Challenge: Promote prevention and reduced releases of Level II substances. Increase knowledge on sources and environmental levels of these substances.
- U.S. and Canadian Challenge: Assess atmospheric inputs of persistent toxic substances. The aim of this effort is to jointly evaluate and report on the impact of long-range transport of persistent toxic substances from world-wide sources by 1998. If ongoing long-range sources are confirmed, work within existing international framework 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 2005.

Priority Activities

To meet the above challenges, EC and USEPA will implement the four-step analytical framework outlined earlier. Through this framework, the governments will engage key partners (i.e., those inside or outside the Basin involved or affected by the use, generation or release of a particular chemical) 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.

EC and USEPA will work with their partners to achieve significant further reductions in the use, generation or release of the targeted toxic substances. Industries and others will also be challenged to reduce the use, release, or generation of other toxic substances of concern.

In addition, EC and USEPA will challenge municipalities, industries, product manufacturers and others outside the Basin to reduce the use, release and generation of persistent, bioaccumulative toxic substances which enter the Great Lakes via long-range transport.

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 measurement of releases or ambient levels is not always feasible for some of the Level I and II substances 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, release, and impact of persistent, bioaccumulative, and toxic chemicals. 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.

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

EC and USEPA commit jointly to providing a formal report of progress under this Strategy every two years at the biennial meeting of SOLEC.

To the extent possible, these progress reports will be consistent and coordinated with progress reports both domestically and for such efforts as the UNECE POPs Protocol, the NAFTA CEC Resolution on the Sound Management of Chemicals, and other multilateral negotiations on POPs and heavy metals. In addition, EC and USEPA will convene a stakeholder forum during the biennial SOLEC to evaluate the status of the Level I and II toxic substances, to refine the challenge milestones, if appropriate, and to assess progress and identify new opportunities. Where appropriate, these reporting structures may be modified to suit the needs for reporting under this Strategy.

In addition, 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. Progress in release reductions will be reported biennially to the IJC and the public.

Significant Issues

EC and USEPA will work together to address significant toxic-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

Sergio Marchi
Minister of the Environment
Government of Canada

Date

Date

Appendix I

LEVEL I AND LEVEL II TOXIC SUBSTANCES

Level I Substances¹

Aldrin/dieldrin
Benzo(a)pyrene {B(a)P}
Chlordane
DDT (+DDD+DDE)
Hexachlorobenzene
Alkyl-lead
Mercury and mercury compounds
Mirex
Octachlorostyrene
PCBs
Dioxins and Furans (2,3,7,8-TCDD toxicity equivalents)
Toxaphene

Level II Substances²

4-bromophenyl phenyl ether
Cadmium and cadmium compounds
1,4-dichlorobenzene
3,3'-dichlorobenzidine
Dinitropyrene
Endrin
Heptachlor (+Heptachlor epoxide)
Hexachlorobutadiene (+Hexachloro-1,3-butadiene)
Hexachlorocyclohexane (including alpha, beta, delta, lindane)
4,4'-methylenebis(2-chloroaniline)

Methoxychlor
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

¹ Level I substances are the 11 critical pollutants identified by the IJC's Great Lakes Water Quality Board, plus two additional critical pollutants identified by the Lake Superior LaMP and the Lake Ontario Toxics Management Plan (Octachlorostyrene and chlordane).

² Level II substances are those substances identified by the Canada-Ontario Agreement respecting the Great Lakes Basin Ecosystem (COA) as "Tier II" chemicals, plus additional substances of concern identified by LaMP and RAP processes and the Great Lakes Water Quality Guidance in the U.S.

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.

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, provinces and Great Lakes stakeholders are undertaking many additional actions to achieve toxic reductions. For purposes of brevity, we have listed selected actions only.

Canadian and U.S. Challenge: Confirm, by 1997, that there is no longer use, generation 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 octachlorostyrene. If ongoing, long-range sources of these substances from outside the United States and Canada are confirmed, work within existing international framework to reduce or phase out releases of the 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.
- EC and USEPA will undertake actions to verify that these five pesticides are no longer used, generated or released in the Great Lakes watershed, based on the weight of evidence from use and environmental monitoring data.
- EC and USEPA will verify that octachlorostyrene (OCS) is no longer deliberately released to the Great Lakes watershed and efforts to eliminate OCS formation as a byproduct will be promoted. Sources of atmospheric emissions will be investigated to support documenting progress.

³When developing the Strategy and the reduction targets, the United States started with the presumption that releases of the Level I pollutants could be reduced by roughly an order of magnitude (90%) by 2005. 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 2005. 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 2005.

- If ongoing local sources of toxaphene⁴ in Lakes Superior and Michigan are confirmed, undertake appropriate actions to seek reductions. If ongoing long-range sources of toxaphene are confirmed, work within existing international framework to reduce 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.

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: Confirm by 1997, that there is no longer use of alkyl-lead in automotive gasoline; reduce or replace by 2005, alkyl-lead in aviation fuel.

In Canada:

- 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.

In the United States:

- Elimination of alkyl-lead in aviation fuel will be investigated in partnership with responsible sources.
- Several actions are taking place to reduce the use of lead in aviation fuel for piston engine aircraft; analysis of possible substitutes will take place to ensure feasibility.

Canadian Challenge: Seek by 2000, a 90 percent reduction of high level (> 50 ppm) 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.

U.S. Challenge: Seek by 2005, a 90 percent reduction nationally of high level PCBs (>500 ppm) used in electrical equipment.

In Canada:

- In Ontario, 5,068 metric tonnes of high level PCB liquid remain in use, while 3,613 tonnes remain in storage, indicating that 42% of Ontario's high level PCBs "once in use" (8,681 tonnes) have been decommissioned. Continued efforts to decommission the remaining PCBs to meet the 90% target will

4 Refers to a complex mixture of polychlorinated bornanes with some resemblance to and some differences from the cancelled pesticide, toxaphene.

be pursued with a goal of "one-stop decommissioning and destruction" where possible in conjunction with owners and interested stakeholders.

- The target for PCB destruction applies to the 18,614 tonnes of high-level PCB wastes now in storage: 240 tonnes have been destroyed to date. Demonstrations of new technologies for PCB destruction are being undertaken, and shipment of PCBs to Alberta and the United States for destruction is being undertaken or investigated, in partnership with PCB owners across Ontario. Consolidation of small quantities for destruction, and decontamination to reduce storage/destruction volumes, is being considered.
- All federally owned PCBs in the Great Lakes watershed will be decommissioned and destroyed by 1996. A total of 17,000 tonnes of low-level PCB waste has been destroyed in Ontario, while 98,000 tonnes remains in storage. Spills, decommissioning and newly discovered PCB contaminated items will contribute to this pool of stored material. Destruction in these instances will be accelerated.

In the United States:

Note: This section does not include PCBs released from contaminated sediments; these are dealt with under a different challenge section of the Strategy.

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. Reductions will be measured from the estimated 200,000 pieces of electrical equipment containing high-level PCBs in use in 1994. In striving to reduce the amount of electrical equipment containing high level PCBs, progress will also be achieved in reducing the number of transformers containing low-level PCBs.

The United States has already achieved substantial reductions in the amount of PCB wastes in existence in this country. On a national basis, the U.S. disposed of (i.e., destroyed) 1.8 billion kilograms of PCB wastes during 1990-92. 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 users of PCBs in electrical equipment whose progress toward phase down is unknown; this goal seeks their voluntary accelerated phase down of remaining high- and low-level PCBs. 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 of PCB wastes destroyed.
- The U.S. aim is to promote accelerated removal of PCBs, with an emphasis on high level PCBs (those >500ppm) in electrical equipment, on a voluntary basis, while ensuring compliance with present management requirements for PCBs that may be used indefinitely.
- USEPA will finalize rules, proposed in 1994, which aim to reduce disposal costs through reduced administrative requirements for, and self implementation of, certain PCB activities, including those involving decontamination (of equipment, 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 rules, proposed in 1993, which aim 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.

Canadian Challenge: Seek by 2000, a 90 percent reduction in the use, generation or release of mercury from sources resulting from human activity that enter the Great Lakes Basin, consistent with the 1994 COA.

U.S. Challenge: Seek by 2005, a 50 percent reduction nationally in the deliberate use and release of mercury from sources resulting from human activity.

Through the Lake Superior Binational Program, Canada and the United States, 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, which has recommended to the governments a timeline for achieving zero discharge.

In Canada:

- It has been estimated that between 2,700 and 3,450 kg of mercury are emitted to the atmosphere in Ontario annually, 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 emissions by 90% 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 United States partners is being considered, and the findings and approaches are being shared with the United States mercury Virtual Elimination Pilot Project.
- Activities by companies to date have resulted in significant reductions in mercury content in batteries (60-90%), fluorescent lamps (44%) and switches, while further reductions are planned, such as 70% by fluorescent lamp manufacturers by 2000. One impact of past mercury usage is that landfill emissions may be a very large source of mercury releases in the Great Lakes Basin, but the quantities released and possible control mechanisms need further consideration.

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. We are using the most recent mercury emissions inventory, i.e., that which was conducted during the early 1990's, 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 (final) and medical waste incinerators (proposed) will, when implemented by 2002, provide about a 70 ton reduction in mercury emissions, or 35% of current total U.S. emissions. Implementation of other Maximum Available Control Technology (MACT) standards offer 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 from the utility sector. The United States has reduced mercury use 75% during the past 15 years, most of which has occurred since 1988. Our use reduction target is set at 50% rather than at a higher reduction target because of an anticipated slowdown in the reduction rate. Given a 30-year trend away from mercury use in the United States, we expect companies to 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; the chlorine production process that relies on mercury is economically inefficient, so the industry is gradually, and of its own volition, shifting to successor technologies.

- USEPA will work with the assistance of the Great Lakes states and others to consult with potential users and releasers to seek their 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 voluntary and regulatory changes with regard to mercury, e.g., labelling requirements and reductions in use in non-essential items.
- USEPA will help strengthen and streamline federal/state coordination of mercury reduction activities by inviting participation in national mercury issues, and by helping to convene a Great Lakes symposium on mercury reduction activities, including state mercury reduction legislation, private sector actions, and other innovative projects.
- USEPA has 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.
- Implementation of Clean Air Act standards for 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 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.

Canadian Challenge: Seek by 2000, a 90 percent reduction in releases of furans, hexachlorobenzene, B(a)P, and dioxins, from sources resulting from human activity that enter the Great Lakes Basin, consistent with the 1994 COA.

U.S. Challenge: Seek by 2005, a 75 percent reduction nationally in total releases of dioxins and furans, from sources resulting from human activity. Seek by 2005, reductions nationally in releases of Hexachlorobenzene and B(a)P from sources resulting from human activity.

Through the Lake Superior Binational Program, Canada and the United States, along with Ontario, Michigan, Minnesota and Wisconsin, have begun implementing a zero discharge demonstration project for dioxins, furans, hexachlorobenzene 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, which is considering recommendations to the governments for a timeline for achieving zero discharge.

In Canada:

- Preliminary Ontario release estimates for benzo(a)pyrene, hexachlorobenzene, 2,3,7,8-TCDD and TCDF suggest more than 90% 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 of hexachlorobenzene by 80% and dioxins and furans by 98-99%. Through pollution prevention, participating companies reported 4,300 tonnes of hydrocarbon emissions and 16,000 tonnes of other wastes 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 towards eliminating use and generation. This trend will be promoted through COA in partnership with priority sources of these pollutants in an effort to achieve the targets of 90% reduction in releases.
- 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 1996 that all mills using chlorine-based bleaching are in full compliance with the "non-measurable" concentration requirement for effluent dioxin and furan and have virtually eliminated PCDD and PCDF from their effluent.
- PCDD, PCDF, and Hexachlorobenzene (HCB) have been assessed and declared toxic under the Canadian Environmental Protection Act. They are to be managed on a national level under Track I (virtual elimination) of the Toxic Substances Management Policy recently announced by the federal

government. A federal/provincial task force is being established to develop control options for TCDD/TCDF and a multistakeholder group will also be established soon to develop options for HCB. Similarly, control options for polycyclic aromatic hydrocarbons (PAHs) including Benzo(a)pyrene are being developed for the major source sectors such as iron and steel and wood preservation.

- 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 United States.

In the United States:

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

- USEPA will complete its re-evaluation of the hazards presented by dioxin, released during 1994 for public comment. The Agency will also complete a policy assessment of dioxin, anticipated to be finalized in Spring 1997.
- As mentioned above, USEPA has promulgated standards for municipal incinerators, and will finalize standards for medical incinerators; incinerators are regarded as major sources of dioxins and furans, as 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 2005.
- 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 benzo(a)pyrene in particular). Potential reductions will be targeted as sources.

Canadian and U.S. Challenge: Promote prevention and reduced releases of Level II substances. Increase knowledge of sources and environmental levels of these substances.

- EC and USEPA will monitor levels of these contaminants in the Great Lakes and resulting impacts on the ecosystem.
- They will also continue to inventory emissions of these 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.
- USEPA will continue to target cadmium under the 33/50 prevention challenge program. In addition, implementation of the Clean Air Act will substantially reduce emissions of PAHs.

Canadian and U.S. Challenge: Assess atmospheric inputs of persistent toxic substances. The aim of this effort is to jointly evaluate and report on the impact of long-range transport of persistent toxic substances from world-wide sources by 1998. If ongoing long-range sources are confirmed, work within existing international framework 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 persistent toxic 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 impact assessment of the long-range transport of persistent toxic substances from world-wide sources by 1998.
- By 1998, EC will demonstrate alternative processes to lessen emissions from 5 predominant sources. In addition, by 2000, Canada will complete inventories of 10 selected air pollution sources to support assessment of the environmental impacts of air toxics.

Canadian and U.S. Challenge: Complete or be well advanced in remediation of priority sites with contaminated bottom sediments in the Great Lakes Basin by 2005.

In Canada:

- Evaluate six innovative technologies developed under the auspices of the Great Lakes 2000 Cleanup Fund (CuF) specifically for the safe removal of contaminated sediments.
- Develop a computerized, searchable and user-friendly Sediment Remediation Database which will include information on 19 technologies (bench & scale) which have been demonstrated and which handle and treat contaminated sediments.
- Describe effects, demonstrate and implement the clean up of severely contaminated sediments with emphasis on priority RAPs/AOCs (Thunder Bay; Sault Ste. Marie; Welland; Hamilton Harbour; Port Hope).
- Develop long-term strategies for remediation of areas of intermediate sediment contamination in the Great Lakes Basin (e.g., Severn Sound, Nipigon Bay, Collingwood Harbour).

In the United States:

- Continue ongoing contaminated sediment cleanup activities in the following Areas of Concern, as well as other priority areas: Ashtabula Harbor, Ohio; Fox River, WI; Grand Calumet River, Indiana; Manistique River, MI/WI; River Raisin, Michigan; Sheboygan River, Wisconsin; St. Lawrence River, New York; Niagara River, NY; and Erie Canal at Lockport, NY.
- Continue to assess and develop approaches for AOCs, and other contaminated sites, in preparation for future activities.

Both federal governments 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., autos, printing) to foster "cleaner, cheaper, smarter" ways of preventing or reducing pollution. Examples include Project XL and ISO 14000. This Strategy will rely first and foremost on the innovative energy of our industrial firms.
- 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 United States, the Common Sense Initiative and 33/50 program will support this action.

DATE	ISSUED TO

[illegible]

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 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 United States, 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 United States and Canada to restore and maintain the chemical, physical, and biological integrity of the water of the Great Lakes Basin Ecosystem.

Persistent Toxic Substances: "Any toxic substance with a half-life, i.e., the time required for the concentration of a substance to diminish to one-half of its original value, in any medium--water, air, sediment, soil or biota--of greater than eight weeks, as well as those toxic substances that bioaccumulate in the tissue of living organisms."

Source: 1987 GLWQA, expanded by the IJC's Sixth Biennial Report on Great Lakes Water Quality

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 nonpoint sources to bodies of water; releases 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