United States Response to Recommendations in the International Joint Commission's Ninth Biennial Report on Great Lakes Water Quality

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INTRODUCTION

The United States (U.S.) compliments the International Joint Commission (the Commission or "IJC") on the release of its ***Ninth Biennial Report on Great Lakes Water Quality***. It contains thoughtful recommendations for actions by the U.S. and Canada (the Parties).

The Parties have made significant efforts and expenditures to address adverse environmental impacts and to mitigating or reversing the subsequent effects. The Parties take pride in their cooperative efforts in working toward proactive solutions to avoid new impacts and to protect the Great Lakes Ecosystem from degradation. The U.S. wishes to assure the Commission of its firm commitment to continue these efforts.

The Commission's ***Ninth Biennial Report***, as in reports past, stresses the need to continue the Parties' efforts in reducing and virtually eliminating, persistent toxics from the Great Lakes. In addition, the Commission has increased its focus on the potential impacts of radioactive substances. The U.S. remains committed to this effort, and along with our Canadian partners, is actively engaged in national, binational, regional, and global efforts to address persistent organic toxic pollutants, be they from air emissions, from nonpoint sources, or from traditional point sources. The U.S. feels that this multilevel approach will increase the pace of toxics reduction in the Great Lakes and within the international community.

The Commission has once again expressed concern over the way in which reductions in government funding may affect Agreement activities. The U.S. is aware of the need for vigilance and innovation to protect and to more efficiently use limited resources. We take very seriously our responsibility to protect the citizens we represent. The U.S. commitment to the Great Lakes remains firm and undiminished. We are actively engaged in ensuring that the needs of the Great Lakes are well met through the efficient use of all resources. The development of State of the Lakes Ecosystem Conference (SOLEC) indicators, for example, will help to target monitoring resources.

It is important to note that this response, while highlighting a small selection of representative activities, reflects the wide universe of programs being undertaken by the large number of U.S. Great Lakes partners. These partners include Federal, State, Tribal and local agencies as well as public, private and non-profit businesses and organizations. This vast array creates a synergy which has led to the significant environmental improvements in the Great Lakes Basin.

The U.S. feels that it is important to strongly reiterate that there are a variety of stressors impacting the Great Lakes ecosystem. We recognize and are addressing the impacts of toxic substances through a variety of existing and new, innovative efforts. But there is also an equally important need to address other areas of vital importance to the health of the Great Lakes. These include, but are not limited to, the protection and restoration of important habitats; enhancing biodiversity; controlling the impacts of exotic species and limiting future introductions; and promoting sustainable patterns of development. The breadth and magnitude of the stressors impacting the Great Lakes both argues for and bolsters the ecosystem approach to research and

management of the Basin which forms the cornerstone of our efforts. The U.S. encourages the IJC to make recommendations as to how the Parties can make continued progress in furthering the adoption and full implementation of the ecosystem approach.

On behalf of the entire U.S. Great Lakes community, the U.S. Department of State and the U.S. Environmental Protection Agency (EPA) are pleased to present this Nation's response to the Commission's ***Ninth Biennial Report on Great Lakes Water Quality***.

CONTAMINATED SEDIMENTS

1. **Governments provide detailed work plans, schedules and benchmarks to complete sediment remediation projects in the eight Areas of Concern for which remediation decisions have been made but action is pending.**

2. **Governments make sediment remediation and management decisions for the 31 Areas of Concern that remain under assessment, and provide detailed work plans, schedules and benchmarks to initiate and complete sediment remediation.**

The United States Great Lakes Program is strongly committed to managing and, where recommended and as opportunities arise, remediating Great Lakes contaminated sediments in all Areas of Concern (AOC) and in other priority areas of the Basin which do not have AOC status. Through the Assessment and Remediation of Contaminated Sediments Program, as well as innovative sediment remediation activities undertaken by the EPA, the U.S. Army Corps of Engineers (USACE), and the eight Great Lakes States, the Basin has long been recognized as a leading forum for sediment management and remediation. Indeed, the U.S. continues to refine its understanding of the issues involved in making these types of decisions and is committed to making them with full public participation.

To date, many resources have been applied to remediate sediments in the Basin which have led to large amounts of contaminated sediments being removed from the environment, including recent or ongoing removals of approximately 600,000 cubic yards (cy) at the following sites:

- 8,000 cy of PCB-contaminated sediment (56,000 lbs. of PCBs) from the Unnamed Tributary of the Ottawa River, Ohio; completed in June 1998, achieving a clean up of 5-10 ppm residual PCBs;

- 28,000 cy of PCB-contaminated sediment (45,000 lbs. of PCBs) from the Ford Monroe site on the River Raisin, MI; completed in the summer of 1997, achieving a clean up of 3-5 ppm residual PCBs;

- 73,000 cy of PCB-contaminated sediment (2,700 lbs. removed out of a total of 4,875 lbs. of PCBs) from the Manistique River and Harbor, MI from 1995 - 1998, thus far achieving the clean up goal of less than 10 ppm; the remaining 45,000 cy to be removed during the 1999/2000 construction seasons;

- 150,000 cy of PCB-contaminated sediment (10,000 lbs. PCBs total) to be removed from Bryant Mill Pond, Kalamazoo River, MI; to be completed in Summer 1999, achieving 0.1 - 0.6 ppm residual PCBs;

- 440,000 cy of PCB-contaminated sediment and soil (300,000 lbs. of PCBs) from the Willow Run Creek, Huron River, MI completed in 1998; achieving the 1 ppm clean up goal for sediment.

- The removal of 345,000 cy of PCB-contaminated sediment from the Saginaw River, MI, beginning in 1999/2000 and to be completed over a 2-year period.

- The removal of 700,000 cy of contaminated sediment (heavy metals, PCBs, PAHs, cyanide, benzene, oil and grease) from the east branch of the Grand Calumet River, IN (USX Site), targeted to begin in 2000/2001 season following design and construction of the sediment disposal facility.

- The removal of 4.65 million cy of contaminated sediment from the Indiana Harbor Ship Canal, IN, with construction of the sediment management facility targeted to begin in 2000 and dredging to follow in 2002.

- The USACE is moving forward with a Comprehensive Dredge Material Management Plan for Waukegan Harbor. Currently the plan calls for dredging 250,000 cy of polluted material by 2002. A critical component of the plan is securing an acceptable site for a confined disposal facility.

Many of these and similar efforts have been highlighted in EPA reports which cover remedial activities achieved through a number of partnerships with federal, state and tribal agencies. These reports include *"Moving Mud"* a synopsis of EPA's Great Lakes National Program Office's (GLNPO) sediment grants program; and *"Realizing Remediation,"* a summary of 33 past or current sediment remediation projects, led by either EPA or by a state environmental agency.

For the six U.S. AOCs for which remediation decisions have been made, substantial progress has been achieved, or will be made in the near future, to address contaminated sediments. Working through the established Remedial Action Plan (RAP) programs in each AOC, site-specific solutions to sediment problems were devised and have been or will be implemented. Most of these remediation decisions have moved toward the implementation phase. The U.S. will also highlight these activities through website postings and other technology transfer venues in order to promote successful cleanup actions within and outside of the Basin.

For the remaining U.S. AOCs where sediment contamination is being assessed, those U.S. federal and state agencies with the legal authorities to develop plans and take action in remediating these sites are working in close cooperation with the RAP processes to develop the detailed work plans, schedules and benchmarks needed to complete sediment remediation and other important projects. The local RAP programs are best able to set schedules for implementing these actions. They provide a context of which actions are needed to restore beneficial use impairments, generate local support for these actions, and report on progress. The U.S. will follow this decision-making process as we work towards remediating these sites. Centralized decision-making could have the unfortunate result of undermining locally-driven processes, while creating expectations which may not accommodate local concerns. This is further complicated because meaningful deadlines need guaranteed resources to undertake these complicated and oftentimes expensive projects. As we have seen in a number of large-scale remediation (such as the

Unnamed Tributary to the Ottawa River), private sector funding can play a vital role. It would be difficult at best to incorporate such an important funding source, which may arise on an *ad hoc* basis, into schedules and workplans.

We agree with the IJC's own findings regarding the impediments to progress in this area. The *White Paper on Contaminated Sediments* (written by the Sediment Priority Action Committee, or SEDPAC, formed under the auspices of the IJC) correctly highlights the following reasons for the slow pace of cleanups: limited funding and resources; regulatory complexity; lack of a decision-making framework; limited corporate involvement; insufficient research and technology development; and limited public and local support. The relative importance of these obstacles varies from site to site, and differs in the U.S. and Canada.

The EPA published a document entitled, EPA's Contaminated Sediment Management Strategy in April 1998 (EPA-823-R-98-001), describing goals, policies, and how we intend to accomplish these goals for managing the problem of contaminated sediment and actions that EPA intends to take to accomplish those goals. This EPA nationwide strategy specifically notes the importance of meeting the goals of the Lakewide Management Plans (LaMPs) and RAPs (page 56). The stated goal for active remediation and natural attenuation projects, outlined in this strategy is, "...to achieve sediments that pose no acute or chronic toxicity to aquatic life and wildlife, and no significant risk to human health and the environment". In the U.S., the specific framework utilized to achieve this goal will vary, depending on the governmental program used to achieve it. The U.S. does not feel that the development of detailed work plans, schedules and benchmarks, prepared outside of the context of the RAPs and governmental programs utilized to achieve RAP goals, is the best use of resources.

We do recognize the importance of deadlines, but we feel that this is the purview of each RAP process as it works to define these goals with local stakeholders and those federal and state agencies which implement the remedial activities. We would question the value of developing and submitting such schedules to a third party external to the RAP process. It should also be noted that there is the possibility that some RAPs may determine that sediment remediation is not practicable and that natural processes should be allowed to remediate the pollution once sources are controlled. We will make every effort to ensure that RAPs articulate schedules and deadlines when they are established.

On April 7, 1997, the United States and Canada signed "*The Great Lakes Binational Toxics Strategy: Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes*" (BNS). A goal was agreed to by both Governments for contaminated sediments to "Complete or be well advanced in remediation of priority sites with contaminated bottom sediments in the Great Lakes Basin by 2006." We believe that the United States will achieve this goal. As part of our commitment to this goal we will track and report progress achieved.

AIR POLLUTION

3. Governments accelerate development of integrated, binational programs, including common benchmarks and schedules, to reduce and eliminate specific sources of toxic and persistent toxic substances to the atmosphere, including sources outside the Great Lakes basin.

The reduction and elimination of specific sources of toxic and persistent toxic substances to the atmosphere, including sources outside the Great Lakes basin, is a critical component for restoring and maintaining the health of the lakes. Studies have shown that atmospheric deposition is a major pathway for toxic contaminants in the Great Lakes, including from sources outside the basin. The U.S. is accelerating the development of integrated programs and as a result of these efforts, there are an increasing number of activities to address emissions of toxic substances. The following are some of the ongoing regulatory and voluntary initiatives that will reduce atmospheric deposition of toxic substances to the Great Lakes.

Binational Toxics Strategy

EPA and Environment Canada, in collaboration with other stakeholders, are implementing the *Great Lakes Binational Toxics Strategy: Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes* (*BNS*). A number of actions is now occurring to achieve the use and release reduction goals for the substances targeted by the BNS: dioxins/furans, mercury, PCBs, hexachlorobenzene, benzo(a)pyrene, alkyl lead, octachlorostyrene, and a number of canceled or restricted pesticides. Now two years into the implementation of the BNS, some of the progress that has been monitored under the BNS includes:

- Agreements have been entered into with the American Hospital Association to eliminate mercury from hospital waste; three northwest Indiana steel mills to reduce their use of mercury; and the chlor-alkali industry to reduce mercury use by 50 percent from 1990-1995 levels.

- Clean Sweeps have been conducted which have included BNS-banned pesticides.

- We have confirmed that there is no longer use of alkyl-lead in automotive gasoline.

- An assessment of the long-range transport contributions of toxic substances to the Great Lakes is being conducted.

- A wide number of stakeholders, including industrial and environmental groups, are participating in implementing the BNS and are designing additional actions to assist in meeting the Strategy's goals.

PBT Strategy

EPA has developed a draft national *Multimedia Strategy for Persistent, Bioaccumulative, and Toxic Pollutants* (PBT Strategy). The PBT Strategy will use a coordinated effort among all national and regional programs for the reduction of PBT substances in the environment. Starting with the BNS Level 1 substances, National Action Plans are being developed for each PBT substance or group of substances and should be available by December 1999. An action plan for mercury has already been drafted and is currently under revision, taking into account those recommendations obtained during the public comment period. In addition, work is ongoing to develop a standard methodology for identifying additional PBT substances for action. The PBT Strategy will assist in obtaining out of basin reductions of persistent toxic substances.

Regulations/Guidance

EPA published final rules which apply to certain municipal solid waste incinerators (large units, meaning those with a combustion capacity greater than 250 tons of municipal waste per day), and hospital/medical/infectious waste incinerators (hereafter called medical waste incinerators). Both include new requirements for emission limitation to control chlorinated dioxins, mercury, particulate matter and carbon monoxide among other pollutants. EPA is also in the process of finalizing rules for hazardous waste combustors that will reduce emissions of toxic pollutants. The combined effect of federal, state, and voluntary private sector initiatives will result in a 75 percent or greater reduction in total dioxin releases to air between 1987 and 2006.

The use of leaded gasoline in on-road vehicles is prohibited under Clean Air Act regulations. As a result, the use of leaded gas in on-road vehicles has been virtually eliminated. In 1998, EPA issued a notice that would include “Gasoline Distribution Stage I Aviation” in a listing under Section 112(c)(6) of the Clean Air Act that would place the evaporative loss emissions of aviation gas associated with airplane fueling, a source of alkyl lead, on a schedule for the development of Maximum Achievable Control Technology (MACT) regulations.

As a result of the Synthetic Organic Chemical Manufacturing Industry Hazardous Organic National Emission Standards for Hazardous Air Pollutants (NESHAP), there has been about a 90% reduction in hexachlorobenzene (HCB) air emissions since 1990. A June 1999 air toxic standard for pesticide active ingredients will further reduce HCB emissions.

EPA is conducting research on treatment options for mercury wastes, taking into account air emissions from such treatment. The Agency is collecting data on air emissions during treatment of mercury-containing wastes and on May 28, 1999 published an Advance Notice of Proposed Rulemaking concerning potential revision of the land disposal restrictions for mercury containing waste.

The Administrator of EPA must make a finding as to whether regulation of mercury and other toxics from electric utilities is appropriate and necessary by the end of the year 2000. In order to assure that this finding and any subsequent decisions regarding mercury are based on the best scientific information EPA is undertaking a number of inquiries, including:

- Using the information gathering authority under the Clean Air Act, EPA is requiring all coal fired power plants of greater than 25MW to report the mercury content of their coal and a sample of the plants to do actual stack testing. Emissions factors generated from the stack test results will allow EPA to calculate mercury emissions estimates for each coal fired plant. This effort will provide the best inventory of mercury emissions from electric power plants and will provide data on the species in which mercury is emitted. The species of mercury emissions is important because different species behave differently in transport and because mercury control technology effectiveness varies by species. The first quarter reports on the mercury in coal were due to EPA in May 1999 and the EPA will publish the results on its web-site shortly thereafter. This information collection will continue through mid 2000.

- Conducting a two-phase research program to develop more cost effective technologies to control mercury emissions from coal-fired electric power generating plants. The first phase includes activities prior to December 2000, when the Administrator will make a finding. This phase emphasizes evaluation and small scale pilot testing of technologies for mercury control and includes engineering and economic studies. The second phase will consist of three to five large scale pilot tests of promising technologies that will be conducted with the Department of Energy and the Electric Power Research Institute and will be partnered with industry. These large scale pilot tests will focus on several primary types of plant configurations.

- EPA is funding a review of recent mercury health research by the National Academy of Sciences. This review which is about to begin and expected to take a year will assure that EPA has the very latest information from emerging health studies concerning mercury.

In addition to these efforts other EPA research activities concerning mercury include those that will improve our understanding of mercury transport and fate in the environment and human exposure to mercury.

International Efforts

Internationally, efforts include a legally-binding protocol on persistent organic pollutants (POPs) signed in June 1998 by members of the United Nations Economic Commission for Europe (ECE-which includes the U.S. and Canada) under the Convention on Long-Range Transboundary Air Pollution (LRTAP). The objective of the POPs protocol is to control, reduce or eliminate releases of persistent organic pollutants, starting with a set of 16 substances which include many of those targeted by the BNS. In June 1998, most of the ECE's 55 member countries signed the POPs protocol. A second LRTAP Protocol concluded and signed by most of the ECE member

countries in June 1998 will reduce emissions of lead, cadmium, and mercury below 1990 levels, phase out leaded gasoline, and promote a number of voluntary measures to reduce mercury levels in products. The Administration is also working on possible new U.S. legislation for import and export requirements for hazardous and other wastes under the Basel Convention.

Under the United Nations Environment Program, a global Persistent Organic Pollutant (POPs) treaty is presently being negotiated. The goal is to complete agreement by the end of the year 2000 on the first 12 POPs chemicals and on the criteria for selecting additional chemicals.

The U.S., Canada and Mexico, under the authority of the North American Agreement on Environmental Cooperation, and under the auspices of the Commission for Environmental Cooperation (CEC) have developed North American Regional Action Plans for mercury, PCBs, DDT, and chlordane. These four action plans on persistent and toxic substances represents the common desire of these three countries to address national and regional concerns associated with the sound management of chemicals. On June 28, 1999, the CEC Council announced the development of a North American Regional Action Plan (NARAP) to reduce releases to the environment of dioxins and furans, and hexachlorobenzene. The CEC Council reaffirmed its commitment to reduce chemical pollutants affecting the health of their citizens, particularly children, and also agreed to develop an environmental monitoring and assessment action plan in support of the sound management of chemicals.

4. Governments develop and communicate to the public, by December 31, 2000, a comprehensive strategy for altering established energy production and use patterns to achieve reductions in mercury and nitrogen oxide emissions.

In the broadest context, the goals and strategies of the most recent national energy strategy (Comprehensive National Energy Strategy, April 1998; DOE/S-1024; http://www.hr.doe.gov/nesp/cnes.htm) communicates the U.S. approach to addressing environmental issues in energy production and use. This approach provides a market-based energy strategy for the simultaneous pursuit of various national goals, such as improving energy efficiency, expanding the portfolio of clean energy sources, and promoting environmentally protective energy production and use. In the more focused context of pursuing emission reduction goals in the U.S., EPA has generally preferred flexibility in selecting cost-effective compliance options rather than prescribing any particular means to achieve those reductions. Thus, development of a separate “strategy for altering established energy production and use patterns” as recommended by the IJC is neither necessary nor the ideal approach for the U.S.

However, EPA is fostering actions to reduce harmful emissions that may result in changes in energy production and use patterns. In addition, there are several voluntary programs managed by EPA and other agencies which encourage more efficient production and use of electricity, such as the Green Lights and Energy Star Programs, and the new Combined Heat and Power Challenge.

Several activities are underway to address emissions of nitrogen oxides (NOx) and mercury, and to track emissions changes that may result from restructuring of the power generating industry. In 2000, implementation of the second phase of NOx emission reductions under the Acid Rain Program will reduce these emissions from utility boilers by two million tons. Actual NOx emissions are monitored at all major U.S. power plants by continuous and other monitoring systems, and this data is available to the public.

Following the adoption of an open transmission access rule (Order 888) by the Federal Energy Regulatory Commission (FERC) in May 1996, EPA, in conjunction with FERC and the Department of Energy, embarked on developing a data system for tracking possible emissions increases related to electricity industry restructuring. This has evolved into the Emissions and Generation Resource Integrated Database (E-GRID), which was released by EPA in December 1998 and is available via the INTERNET at **www.epa.gov/ardpublc/acidrain/egrid/egrid.htm**. In a single public database, E-GRID will contain data collected by various agencies, including emissions profiles and resource mixes for all power plants, electric generating companies, and regions of the U.S. power grid. E-GRID will provide data necessary for policy and regulatory development in areas such as output-based emission standards, renewable portfolio standards, and emissions disclosure to consumers. In September 1998, EPA called for a reduction in NOx emissions, a major precursor of ozone, by 1.1 million tons annually in 22 eastern states. EPA expects this action would mitigate ozone transport problems associated with power generation. Implementation of this action has been stayed, at least temporarily, by U.S. Courts in relation to ongoing litigation. However, EPA is in the process of moving forward on petitions filed by several northeastern states under section 126 of the Clean Air Act. These petitions request EPA to reduce NOx emissions from sources located in upwind states. In response to these petitions, and on the basis of other information, EPA expects to promulgate a market-based capped trading program to control NOx emissions from certain stationary sources, including utilities.

Regarding mercury emissions, EPA has established emission standards (for new units) and emission guidelines (to be implemented by states for existing units) for municipal waste combustors and medical waste incinerators (the latter is referred to as the hospital/medical/infectious waste incinerator final rule because it covers both hospital waste and medical infectious waste). When fully implemented, these rules will reduce mercury emissions from municipal waste sources by about 90 percent, and from medical incinerators by 95 percent. And in the very near future, EPA will issue a standard for hazardous air pollutants, including mercury, from hazardous waste combustion facilities. Work is underway to develop standards for several categories of combustion units and for chlor-alkali plants. Coal-burning electric utilities are the highest remaining source category in the U.S., and the EPA will issue a determination in December 2000 whether regulation of air toxics emissions, including mercury, from utilities is appropriate and necessary to protect public health. During this period, EPA will collect and increase public access to data on mercury emissions from power plants, and together with the Department of Energy will support the development and commercialization of cost-effective control technologies for mercury emissions. Efforts are underway to continue to report and communicate with the public on progress made in all of these areas.

AGRICULTURAL PRACTICES

5. Governments adopt the following agricultural and land-use goals and targets:

- **to place at least 55 per cent of the Great Lakes basin row-crop acreage into conservation tillage by 2002;**

- **to increase buffer-strip mileage in the Great Lakes basin by at least 30 per cent by 2002 [1998 baseline]; and**

- **to reduce herbicide loads to the Great Lakes by at least 30 per cent by 2005.**

The U.S. fully endorses the goals and targets of this recommendation and hopes to be able to exceed these very important goals regarding the state of environmental conservation and pollution reduction programs being implemented in the Great Lakes Basin. Many of the goals have been incorporated into the strategic plans of various implementing agencies through the U.S. Government Performance and Results Act (GPRA).

The IJC is correct in highlighting how conservation practices such as conservation tillage and buffer strips serve to reduce the loads of herbicides and pesticides to the surface and groundwater of the Basin. In addition, innovative and important programs such as USDA's Conservation Reserve Program (CRP), National Conservation Buffer Initiative, and Environment Quality Incentive Program (EQIP) provide a "systems approach" for addressing agricultural nonpoint source pollution to the Great Lakes. This approach aims for an end-product from which a "healthy land" is constructed, which promotes sustainable production of food and fiber products while maintaining environmental quality and a strong natural resource base.

In addition, EPA has several standing programs (e.g., Section 319 nonpoint source pollution control, National Pollutant Discharge Elimination System (NPDES) permitting, State Revolving Fund) to address soil erosion and sedimentation in the Basin, as well as numerous groundwater protection activities. Overall government strategies are being coordinated under the Administration's Clean Water Action Plan which will help achieve substantial reductions in nonpoint source pollution through the setting of national goals which are coupled with on-the-ground activities at the watershed level. This approach will allow nationwide goals to be tailored to the needs of a specific watershed.

The U.S. would like to sound a cautionary note regarding the realities of achieving these laudable goals. In many parts of the Great Lakes watershed, nonpoint source loadings are largely from ground water, which may account for 60-80 percent of all stream flow. Nonpoint source loadings from ground water may take years, decades, or longer to decrease and therefore may make it difficult to achieve the 30 percent reduction goal by the year 2005. The U.S. is working to improve its understanding of the impacts of ground water as a major source of herbicide loadings to the Great Lakes. Recent improvements in herbicide application Best Management Practices (BMPs) are designed to help reduce the infiltration of these substances into the ground water and

therefore reduce loadings. A further confounding factor, identified by the USGS, is that pesticide loads from urban watersheds can be as high or higher than those found in agricultural watersheds, chiefly due to storm water runoff, and may further impact the ability to achieve the recommended reductions. The U.S. Great Lakes Program in general, and the USGS in particular, will continue to research and address the impacts of ground water in the Basin.

Responses to the three specific recommendations are listed below:

As reported in the Great Lakes Commission's April 1996 report entitled *"An Agricultural Profile in the Great Lakes Basin: Characteristics and Trends in Production, Land-use and Environmental Impacts,"* conservation tillage is rapidly becoming the primary cultivation practice in the Basin, affecting as much as 70 percent of the total acreage in many counties, and 48 percent basinwide. The report further states that most of southern Michigan, northern Ohio, and Indiana report conservation tillage in excess of 60 percent (based on 1992 U.S. Agriculture Census). In the intervening years, conservation tillage levels continue to increase. Nationally, the USDA goal for acreage under conservation tillage is 50 percent of cropped acres by the year 2002. Conservation tillage can reduce soil erosion by 50 to 90 percent compared to conventional tillage. As a corollary to conservation tillage, more than 800,000 acres of highly erodible farmland in the Basin were enrolled in the CRP Program, substantially reducing soil erosion and runoff. These practices can also lead to sharply reduced levels of nutrient and herbicide runoff. The U.S. will continue to strongly promote the implementation of these and other conservation programs throughout the Great Lakes Basin.

The use of buffer strips is another important tool for limiting runoff and associated pollutants from agricultural lands in the Basin. The 1996 Farm Bill created a major new opportunity to prevent pollution and restore watersheds through a focused effort to put conservation buffers in place in rural watersheds in this country. USDA's unprecedented National Conservation Buffer Initiative is set to install conservation buffers along two million of the nation's 3.5 million riparian miles by 2002. Conservation buffers are strips of vegetation along the margins of farm fields, streams, creeks, and lakes which intercept runoff water, nutrients, and pesticides before they can drain into waterways. USDA will reserve four million acres from the CRP for the establishment of conservation buffers. A baseline is currently being developed so that success on this goal can be tracked.

The U.S. fully recognizes the need to further reduce the loadings of pesticides and herbicides to the Great Lakes. Although over 120 pesticide active ingredients are used in the Basin, the top five herbicides alone (atrazine, metolachlor, cyanazine, acetochlor and alachlor) account for about 53 percent of the total volume, and are primarily applied in the southern Lake Michigan and western Lake Ontario basins. Nonpoint source control programs are being coupled with toxic reduction programs to achieve lower levels of herbicide use in the Basin. The previously cited *"Agricultural Profile"* has highlighted a general decline in pesticide applications for the period 1981/82-1991/92 which is in a large part due to lower application rates for existing substances, as well as new generation pesticides which are applied at much lower rates. Conservation tillage programs are helping to reduce the use of herbicides. Chemicals are being specifically designed

for the conservation tillage market which allow for much lower application levels, which leads to reduced runoff.

Under EPA's Agricultural Stewardship Program, the Agency hopes to place 75 percent of agricultural lands under Integrated Pest Management (IPM) which will help to further reduce the use of herbicides and the attendant potential for polluted runoff to the Lakes. Under the EQIP Program, NRCS has the ability to cost-share IPM implementation activities.

A 1998 preliminary U.S. Department of Agriculture sponsored report entitled *"Twenty-Five Year Trend in the Potential for Environmental Risk from Pesticide Leaching and Runoff from Farm Fields"* highlighted environmental indicators of the *potential* for pesticide leaching and runoff from farm fields. The report showed that the potential risk to drinking water through runoff in recent years was only about 30 percent of the 1972 level, with the greatest decreases occurring in the Midwest East Regions) which include the Great Lakes.

AOCS AND LAMPS

6. Governments implement the eight recommendations presented in the Commission's report, *Beacons of Light,* that deal with human health, public-private partnerships, funding and staffing, public participation, information transfer, quantification of environmental benefits and public advisory council funding.

The U.S. remains committed to fully implementing the RAP Program at the 26 U.S. and five binational AOCs. In all AOCs, active and meaningful involvement of all stakeholders, including public, private, and governmental entities, is essential for achieving the restoration of beneficial uses. We appreciate the IJC's continuing efforts to review and analyze the RAP process to help the Parties identify successful, efficient, and cost-effective strategies. In addition, the IJC is playing a key role by helping the Parties disseminate important information regarding these strategies. The in-depth reviews of selected AOCs over the last biennium have also helped the Parties to better target their efforts. This continuing complementary relationship between the Parties and IJC will continue to enhance future RAP implementation and restoration activities.

The U.S. responses to specific recommendations contained in *Beacons of Light* are presented below.

Human Health Considerations

IJC recommends that human health information being developed for LaMPs be incorporated as appropriate into the RAP development process. This information should provide considerable justification for many needed remedial actions in various AOCs and should especially be disseminated within AOCs which have susceptible populations consuming sport-caught fish.

The LaMPs and AOCs programs located within the associated lake basin, coordinate activities and share information on a continuing basis. In the U.S., the LaMP Program Managers also have the responsibility to track RAP progress. Through these parallel and complementary roles, these managers can insure that LaMP-related human health information is incorporated into the RAP decision-making process.

It also needs to be recognized that human health issues from a Great Lakes and/or lakewide perspective might differ from the more localized RAP perspective. Many of the RAP processes are already fully aware of human health issues which may be impacting susceptible local populations. Some RAPs are also much farther along than the LaMPs; should the LaMPs adopt additional human health issues, it may be difficult to incorporate these issues into the RAPs**.** While we agree that human health is an important topic under both programs, the RAPs and LaMPs cannot address all health issues and must therefore focus on those specifically related to water quality. LaMPs and RAPs consider drinking water restrictions, consumption advisories and beach closings. These three impairment indicators are the most direct indicators of potential human health threats and are included in all LaMPs and RAPs. Many of these concerns are due to sediments contaminated with past discharges of toxic substances. As these sources and point source discharges are either being controlled or remediated, the U.S. will continue to actively address nonpoint and atmospheric sources of toxic substances that can impact human health. Through the RAP and LaMP Programs, the BNS, and other pollution prevention and control programs, the U.S. Great Lakes Program's goal is to identify, prevent and remediate threats to human health.

The Agency for Toxic Substances and Disease Registry (ATSDR) has been very proactive in sharing the research findings from its Great Lakes Human Health Effects Research Program (GLHHERP). ATSDR GLHHERP is designed to investigate the potential for short- and long-term health effects from consumption of contaminated Great Lakes fish. This research is being conducted in susceptible populations including Native Americans, sport anglers, pregnant women, fetuses, children, the urban poor, and the elderly because of their elevated exposures or physiologic sensitivity to these contaminants. ATSDR has and currently participates in a number of LaMP and RAP meetings, workshops, and committees to share the human health findings with these groups and discuss the public health implications of these findings.

Public-Private Partnerships

The U.S. Environmental Protection Agency and the states of Indiana and Ohio cooperatively compile lessons learned from the Ashtabula and Grand Calumet partnerships and disseminate the information to other AOCs. IJC recommends that this successful strategy be looked at carefully by both Federal Governments for application in other AOCs.

The U.S. RAP partners throughout the Basin are looking at ways to improve the dissemination of successful RAP partnerships. EPA is funding the Great Lakes Commission to develop and

maintain an Internet site containing information on all 26 U.S. and five binational AOCs. Information will be added on a regular basis to highlight activities that are transferable to any number of AOCs.

The unique situation in the Ashtabula River AOC (the Ashtabula Partnership) and in the Grand Calumet region are prime examples of the success which can be derived through the innovative use of public-private partnerships. The U.S. strongly supports such efforts and is actively promoting them throughout the Basin. The U.S. will confer with Great Lakes Commission staff regarding a special Internet posting on the AOC website which highlights the achievements of these two RAPs. These highlight pages will serve as models for future RAP highlight postings.

Funding and Staffing

IJC recommends that the Parties undertake a transparent planning activity aimed at identifying resources available annually for RAP planning and implementation activities as well as resources still required to restore beneficial uses in the 42 AOCs within the Great Lakes basin. Inter alia, this information should be used to balance between planning and implementation activities.

IJC recommends that the Parties and jurisdiction determine both the minimal and optimal levels of support necessary to complete planning and implementation of each AOCs restoration activities.

The U.S. is actively engaged at the federal, state, and local levels in attempting to identify priority actions and the associated funding required to implement these activities. This includes supporting remedial projects, securing core funding for coordinating the RAP process, maintaining institutional history, and funding nongovernmental organizations so they can be fully engaged. EPA LaMP Program Managers have initiated a process by which they are meeting with both governmental and nongovernmental stakeholders to identify priority activities and those resources which are available and/or could be used to leverage additional funding in order to meet the needs of the AOC.

The eight Great Lakes States also conducted Unified Watershed Assessments (UWAs) under the terms of the Administration's Clean Water Action Plan (CWAP). The UWAs identified those priority watersheds in need of some level of restoration. The majority of Great Lakes watersheds which contain an AOC were listed as priorities under the UWAs. This makes them eligible for additional funds which will are being made available under the CWAP.

The IJC's request for the Parties to identify in an expedited manner the resource levels necessary to restore each AOC does not fully recognize the inherent robustness of the RAP process whereby all stakeholders are equal partners in identifying such needs. The added transaction times required to make these decisions can lead to better priority setting and implementation.

Public Participation

IJC recommends more resources be mobilized by the Parties and jurisdictions in order to enhance public participation efforts. In order to increase public awareness of and participation in AOC restoration efforts, low-cost or no-cost means of reaching and influencing the public should be better utilized.

The U.S. is dedicated to the concept of community-based environmental protection as exemplified by the high levels of public involvement in the RAP program. RAP Public Advisory Committees (PACs) are vital components of the RAP process. This has long been recognized by the U.S. and is supported by financial and technical resources so that these citizens can fill these important voluntary roles.

The U.S. also recognizes that more resources would enhance the public participation process. But this need must be balanced against the equally important needs of planning, coordination, and implementation. The levels of resources available for direct public participation through the PACs are reviewed on an annual basis to determine if changes are needed. The U.S. is also actively implementing other types of public outreach (Internet websites, public talks, press releases, annual and biennial Great Lakes ecosystem reports) as cost-effective methods of reaching out to and informing the public. We will continue to use these avenues and to identify new ones in order to increase public participation in the RAP process.

Information Transfer

IJC recommends greater use of available technology to enhance public participation efforts and improve the transfer of information and technology to and between AOCs. Efforts similar to the U.S. EPA web site for nonprofit organizations are needed. Increased private sector participation could be instrumental in carrying out this activity. Publishing RAP documents and other publications on web sites would provide a cost-effective means of sharing advances in remediation strategy and technology.

The U.S. fully supports this recommendation and has several activities already being implemented which will help meet these laudable goals. As mentioned previously, EPA has partnered with the Great Lakes Commission to create and maintain a website for the 26 U.S. and five binational AOCs. This site includes fact sheets on each AOC, RAP status, use impairment restoration progress, and electronic versions of RAP documents and newsletters. In addition, contact persons at the PAC, state and federal levels are included. This site will be updated on a regular schedule as well as on an *ad hoc* basis as events warrant. The U.S. encourages the IJC and all other interested parties to visit the site at:

www.epa.gov/glnpo/aoc/

Some states, such as Ohio, also maintain their own AOC websites which contain detailed RAP information updated on a regular basis. This website is located at:

http://chagrin.epa.state.oh.us/programs/rap/rap.html

Quantification of Environmental Benefits

The reduction in risk to human health achieved under the Superfund Program in the Waukegan Harbor AOC has not received optimal public exposure. IJC recommends additional effort be devoted to properly informing citizens and politicians of this notable success.

The U.S. is proud of the coordinated actions which led to the removal of almost 1,000,000 pounds of PCBs from the Waukegan Harbor AOC. PCBs are one of the compounds largely responsible for fish consumption advisories in the Great Lakes. This removed mass represented the largest single source of PCBs in the Great Lakes. This significant environmental improvement was covered by the local media and was highlighted in numerous reports from both EPA and Illinois EPA as well as the Waukegan Harbor Citizen Advisory Group (CAG). In addition, the work of the CAG and the associated governmental partners in achieving this unprecedented cleanup was recognized at the SOLEC awards event in October 1998. The U.S. agrees that such important success stories should be given a high level of public exposure. We will explore additional methods for publicizing the reductions in risk to human health achieved under the Superfund Program at this and other sites.

In addition Waukegan Harbor is one of the highlighted ports of call for an educational boat tour in 1999. The tour, Making Lake Michigan Great, is a partnership with the Lake Michigan Forum and Grand Valley State University in cooperation with the Waukegan Harbor Citizens' Advisory Group (CAG). Also the CAG has established its own home page on the Internet to announce environmental progress being made at the harbor.

In a related activity, EPA is partially funding a Northeast-Midwest Institute study to analyze the economic benefits related to the cleanup of contaminated sediments in areas such as the Waukegan Harbor AOC.

PAC Funding

The Muskegon Lake Public Advisory Council example of aggressive fund-raising serves to show that many PACs could be more effective in seeking outside funding. IJC recommends that inter-PAC transfer of information concerning funding sources and techniques be promoted.

As mentioned previously, EPA has set up a RAP website where information can be shared amongst PACs. In addition, EPA LaMP Program Managers track progress on all AOCs within

their respective lake basins. This affords them a unique opportunity to promote the cross-fertilization of ideas among PACs regarding funding techniques and sources as well as other technical information.

EPA did produce a series of funding documents for RAPs which describe a variety of funding opportunities ranging from foundation grants to incorporation. These are still available from EPA's Great Lakes National Program Office (GLNPO). GLNPO is also developing a funding guidance document which will identify funding opportunities from both public and private sector sources.

The U.S. encourages and supports annual statewide PAC meetings where PAC representatives from each AOC in a given state can spend a day discussing common problems and sharing important information.

The U.S. will continue to develop and promote innovative and effective methods to promote these and other methods of information sharing throughout the Great Lakes Basin.

7. Governments review the current environmental status and programs in place to address environmental issues in the Lake St. Clair and the St. Joseph River areas, and report this information to the Commission, so that the Commission may direct the Great Lakes Water Quality Board to advise on their possible designation as Areas of Concern under the Agreement.

The states of Michigan and Indiana have undertaken thorough reviews of the environmental status and programs in place in both Lake St. Clair and the St. Joseph River areas. Based on their findings, the U.S. does not believe that either of these areas need to be nominated for AOC status. This information will be made available to the Water Quality Board for their information and review.

BACKGROUND - ST. JOSEPH RIVER

The St. Joseph River starts in Michigan near Albion, flows generally southwesterly through South Bend, Indiana, and then turns northwest to empty into Lake Michigan at Benton Harbor. Potential impairments to beneficial uses were evaluated in 1985 by the Michigan Department of Natural Resources when the AOC program originated. It was determined then that the St. Joseph River was not an AOC. Since that time, no new beneficial use impairments have been identified.

ISSUES

- **PCBs:** There is a consumption advisory for PCB contamination for carp, smallmouth bass, and walleye on various reaches of the river, but these are no more than are found on other tributaries to Lake Michigan. Results of a caged fish study conducted in 1997 by the Michigan Department of Environmental Quality (MDEQ) showed PCBs accumulating in fish, but at much lower levels than found in most AOCs where PCBs are a major problem.

- **Atrazine:** New information available from the 1993-1995 Lake Michigan Mass Balance Study indicates that the St. Joseph River has high concentrations of the corn herbicide atrazine during certain times of the year. Atrazine loads to Lake Michigan from the St. Joseph River are the highest of all Lake Michigan tributaries. These levels may be of concern to the Lake Michigan LaMP effort, but are not known to be impairing any beneficial uses in the river or Lake Michigan at this time. Moreover, the Lake Michigan Mass Balance Study has not detected any bioaccumulation in fish. If any atrazine-specific problems arise within the river system, they can be addressed by specific programs, including nonpoint source pollution controls, pollution prevention programs, or placement on the MDEQ's 303(d) list with subsequent Total Mass Daily Load (TMDL) development. The river does not need to be an AOC to effectively address the atrazine issue. The river also does not need to be an AOC to receive attention from the MDEQ, as regulatory programs and monitoring programs are now being applied to the St. Joseph River.

Public Involvement

The Friends of the St. Joe River Association is a grass-roots citizen group that is working on local environmental problems in the river. The MDEQ - Plainwell District office responds to needs of this group. The president of the Friends of the St. Joe River Association is on the Lake Michigan Forum for the Lake Michigan LaMP.

Summary

The St. Joseph River has the usual suite of water quality problems for rivers in the Great Lakes Basin and these are being addressed by current programs. Atrazine levels may be of concern, but these also can be addressed through available programs. However, we do not believe that the river has the severity of problems that would qualify for AOC status; further, identifying it as an AOC would be of no added value to the efforts to restore and protect the river.

BACKGROUND - LAKE ST. CLAIR

Lake St. Clair serves as a link in the chain of connecting channels between Lake Huron and Lake Erie. Lake St. Clair is shallow (6.5 meter maximum natural depth) and has a short retention time (5-7 days) compared to most lakes. Ninety-seven percent or more of the inflow to Lake St. Clair comes from the St. Clair River. Other tributaries include the Clinton River in Michigan, and the Thames and Sydenham Rivers in Ontario. Both the St. Clair River and the Clinton River are currently designated as AOCs with RAPs in development.

Issues

The U.S.-Canada *Upper Great Lakes Connecting Channels Study (UGLCCS)* of 1988 detailed the results of intensive binational study of nutrients, toxic chemicals and other environmental concerns for Lake St. Clair. Since 1994, weather patterns and inputs of nutrients and bacteria (from combined sewer overflows and nonpoint sources) have combined to yield frequent beach closings and extensive mats of aquatic vegetation which hamper boating and produce strong odors

when they decompose. Macomb County, Michigan in particular, has suffered economic impacts due to these conditions.

PUBLIC INVOLVEMENT

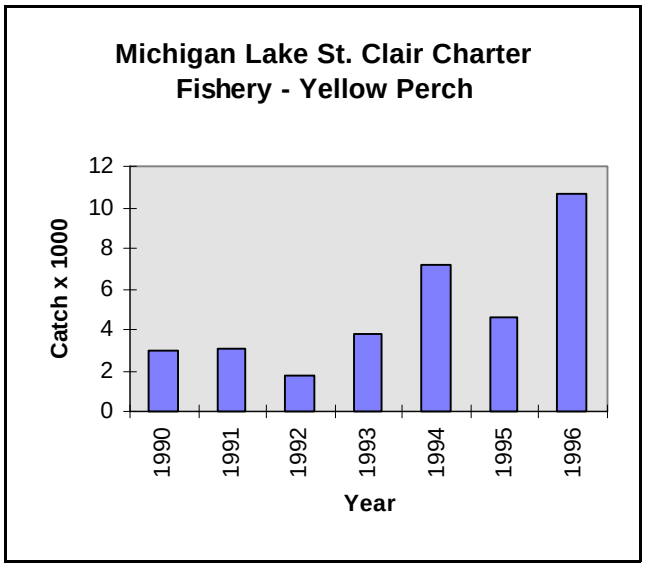
A Macomb County "Blue Ribbon" Commission was established locally to study Lake St. Clair issues and make recommendations for their resolution. The County Commission and its deliberations received a significant amount of press regionally and it continues to gain respect and attention at the state, provincial, and federal levels of government.

The County Commission specifically declined to recommend designating Lake St. Clair as an AOC after careful deliberations.

Each of the tributary AOCs (the St. Clair and Clinton Rivers) also have active public groups involved in water quality/environmental issues through the RAP program. There are also several other "watershed" and "friends of" organizations located within the Lake St. Clair watershed.

More recently, State and regional officials and environmentalists have agreed to create a watershed organization to establish goals to address environmental problems in Lake St. Clair. The organization, called the Lake St. Clair Lakewide Management Plan will allow for further public-private partnerships for improving the Lake. By giving Lake St. Clair a management identity apart from existing RAPs and LaMPs, more focus and will be brought on those decisions needed to improve environmental conditions.

The Lake St. Clair fish community has actually improved over the past few years. Native predator fish species, including muskellunge, smallmouth and largemouth bass, northern pike, and yellow perch offer some of the best fishing in the world. For instance, the yellow perch fishery, as evidenced by the charter fishery, has seen dramatic increases in total catch and catch per angler hour since the early 1990s years (see figure, information from Michigan Department of Natural Resources). There has also been a tremendous increase in the number, size, and catch per effort of muskellunge. These positive indicators are often overlooked when assessing the state of Lake St. Clair.



Summary

Lake St. Clair has certain water quality problems and environmental issues which are common to the region. In Michigan, these are being addressed by baseline Michigan Department of Environmental Quality programs including the AOC program. Implementation of the

recommendations from the two tributary RAPs and the Blue Ribbon Commission would resolve most of the issues for Lake St. Clair. Identifying Lake St. Clair as an AOC would be of no added value for the Lake.

It should be noted that habitat issues for Lake St. Clair may benefit to some extent from binational cooperation. However, the AOC program would not be the most efficient program to address these issues. Efforts through the locally initiated Lake St.. Clair Lakewide Management Plan, the Great Lakes Fishery Commission (GLFC), the North American Waterfowl Management Plan, the Ramsar Convention, and/or the Great Lakes Wetlands Policy Consortium are possible alternatives.

SCIENCE AND RESEARCH

8. Public and private sectors

- **fund research that expands understanding about the incidence of endocrine disruption in humans and wildlife;**

- **conduct programs to measure and establish the concentration of endocrine-disrupting chemicals in human tissues and fluids; and**

- **investigate endocrine-disrupting capability of chemical mixtures.**

EPA is actively reviewing information indicating the possibility of impacts on human health and the environment associated with exposure to chemicals or environmental agents that act as endocrine disruptors. At the present time, there is little agreement on the extent of the problem. Based on the current state of the science, the Agency considers endocrine disruption to be a mechanism of action potentially leading to other outcomes (for example, carcinogenic, reproductive, or developmental effects), routinely considered in reaching regulatory decisions. EPA thinks that identification of environmental agents that result in endocrine disruption, as well as enhancement of our understanding of how these agents exert their effects, will improve the U.S.'s ability to reduce or prevent risks, particularly to children and vulnerable ecosystems.

Therefore the Agency has developed a two part strategy for dealing with endocrine disruptors: (1) research to understand the basic science and inform the process of risk assessment; and (2) developing a screening program to identify chemicals that act as endocrine disruptors and the effects they cause.

EPA is setting forth a screening program for determining which pesticide chemicals and other substances may have an effect in humans that is similar to an effect produced by a naturally occurring estrogen or other endocrine effects. The Food Quality Protection Act (FQPA) and the amendments to the Safe Drinking Water Act (SDWA), both of which were passed in the summer

of 1996, require the Agency to develop a screening program for endocrine disruptors by August 1998, implement the screening program by August 1999, and report progress to Congress by August 2000.

In developing the Endocrine Disruptor Screening Program, EPA is adopting the recommendations of the Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), a panel comprised of representatives from a cross-section of public and private organizations, including the Agency for Toxic Substances and Disease Registry (ATSDR). Initially, the Endocrine Disruptor Screening Program will focus on estrogenic, androgenic, and thyroid hormone effects. These three hormone systems are presently the most studied of the approximately 50 known vertebrate hormones. *In vitro* and *in vivo* test systems to examine estrogen, androgen, and thyroid effects exist, and are currently the most amenable for regulatory use. Further, inclusion of estrogen, androgen, and thyroid effects will cover aspects of reproduction, development, and growth. As more scientific information becomes available, EPA will consider expanding the scope of the Endocrine Disruptor Screening Program to other hormones. For now, however, the estrogen, androgen, and thyroid hormone effects and test systems represent a scientifically reasonable focus.

In addition, the White House Office of Science and Technology Policy's Committee on Environment and Natural Resources created an Endocrine Disruptor Workgroup in 1996 consisting of representatives of the federal agencies that have a scientific mission. Chaired by EPA and the National Institute of Environmental Health Sciences, the workgroup was tasked with developing and coordinating a federal research program to measure and understand the human and ecological consequences of exposures to endocrine disrupting chemicals. The approach taken by this group includes the development of a federal research inventory, identification of research gaps, facilitation of coordination across the federal government, and initiation of outreach efforts to public interest and private sector groups.

EPA's Region 5 and the Great Lakes National Program Office have taken a great interest in the endocrine disrupting potential of alkylphenols and akylphenol polyethoxylates, chemicals that are discharged by various industries and municipalities into Great Lakes Basin waterways. Studies are now being supported by these offices to better establish the levels of these chemicals in fish and the quantities being discharged by municipal effluents. Studies are also being initiated to quantify the cumulative effects on fish of estrogenic disruptors in municipal effluents, with special emphasis on synthetic and natural hormones and alkylphenols, because of their documented persistence.

In addition, ATSDR's Great Lakes Human Health Effects Research Program is characterizing exposure to the 11 "critical pollutants" identified by the IJC in susceptible populations. These eleven pollutants include chemicals, i.e., dioxins, furans, PCBs, mirex, and DDT which have been identified as endocrine disruptors. Research findings from ATSDR's Great Lakes program indicate neurobehavioral deficits in newborns exposed in utero, and disturbances in reproductive parameters in women who consumed contaminated Great Lakes fish.

Several Great Lakes States are implementing programs to address potential endocrine disrupting substances. Ohio, for example, has several Lake Erie-related projects underway for measuring chemicals that have been associated with endocrine disruption. Great Lakes States are presently coordinating fish contaminant monitoring programs through the Council of Great Lakes Governors and USEPA. Additional parameters are routinely added to the monitoring regime as needed.

9. Governments actively participate in the work of the Communications Task Force under the Council of Great Lakes Research Managers.

The U.S. strongly supports the need for timely and useful scientific information being made available to policymakers so that informed decisions can be made regarding Great Lakes issues. The U.S. and Canada have recently held the third biennial SOLEC where policymakers were invited to presentations by pre-eminent researchers on a variety of topics regarding the health and future of the Great Lakes ecosystem. SOLEC has proven to be highly successful in disseminating important Great Lakes information in easily understood reports and Internet postings. In the years between SOLECs, *State of the Great Lakes* reports are prepared and widely distributed. In addition, both the U.S. and Canada are firmly committed to the timely release of information via the Internet and other outlets.

One of these important outlets is the proposed Communications Task Force (CTF). The CTF would involve a communications specialist from each agency or department represented on the Council of Great Lakes Research Managers. It would be their responsibility to explain their agency's research activities to the general public and elected officials. These explanations should include the results of their work, but their discussions should be much broader than simply results. It is equally and possibly more important to explain research needs, priorities, and capabilities, and to involve these audiences in the process to identify these needs and set these priorities. Explanations should be tailored to the particular audience and presented as concisely as possible.

Some of the important duties of the CTF would be to include the Great Lakes education community so that research results can be taken into the schools of the region; to make use of the latest technology to disseminate information while including traditional means to reach all audiences; and to involve the private sector and the media. At the last IJC Biennial Forum, a number of media representatives came forward to express their interest in helping the CTF disseminate this kind of information and to develop products that are write-ups of research "stories." The CTF must also insure that its work is complementary to, and not duplicative of, other outreach activities which each agency is already undertaking.

In March 1999 the CTF held a Great Lakes Communicators Workshop in cooperation with the IJC, the Great Lakes Fishery Commission, and the Great Lakes Commission. As an outcome of this workshop, a subsequent electronic network of Great Lakes communicators and educators was established.

10. Governments support the development and application of models to assist in the testing, evaluation and implementation of ecosystem indicators, monitoring strategies, and management strategies for water quality, contaminants, fisheries and other ecosystem issues.

The U.S. strongly supports this recommendation and will briefly describe a number of modeling and ecosystem indicator development activities being undertaken both domestically and binationally with our Canadian partners.

Modeling provides researchers the ability to make qualified predictions about future states of a given ecosystem. Based on model findings, decision makers are given the best available data to assist in their actions. The U.S. notes that the IJC understands the utility of using models and have implemented them on Lake Erie, through the completed Lake Erie Ecological Modeling Project. One of the major modeling tools the Parties are currently using in the Great Lakes is mass balance modeling.

Mass balance modeling is based on the principles of conservation of mass and energy; the amount of pollutants entering a lake must equal the amount of pollutants leaving, remaining, or chemically changed in the lake. A model incorporating the processes and activities that affect the transport and distribution of a chemical within the lake can be developed by collecting environmental data and using these data to help mathematically describe the critical rates and exchanges between the various ecosystem components. The model then becomes a valuable tool enabling resource managers to design cost-effective strategies for reducing toxic loads and minimizing human and ecosystem health risks. The development of draft ecosystem objectives for wildlife, habitat, aquatic communities, human health, and environmental stewardship has provided direction and a basis for establishing targets, or ecosystem indicators, as a means to check on the effectiveness of remedial activities.

There are major examples of mass balance models in the Great Lakes Basin:

1. The Green Bay Mass Balance Study was conducted in 1989-90 to pilot the technique of mass balance analysis in understanding the sources and effects of toxic pollutants in the Great Lakes food chain. The study, headed by EPA's Great Lakes National Program Office (GLNPO) and the Wisconsin Department of Natural Resources, had many participants from the federal, state, interagency, and academic communities. The study focused on four representative chemicals or chemical classes: PCBs, dieldrin, cadmium, and lead.

2. The Lake Michigan Mass Balance began in 1994 and will be concluded in 2000. The four major chemicals being studied are mercury, PCBs, atrazine (an agricultural herbicide), and trans-nonachlor (a pesticide). The Lake Michigan Mass Balance is helping us understand how these chemicals are entering the Lake and what happens to them as they move through the ecosystem. This study will identify relative pollutant loads from rivers, air deposition, and sediment resuspension, and will allow us to predict the benefits associated with reducing loads.

3. The continued enhancement of Lake Ontario mass balance models.

In addition to the use of mass balance models, the Great Lakes Fishery Commission relies quite heavily on models and has supported development of quite a few over the years, including an integrated pest management approach to sea lamprey management (IMSL) and Sustainability of Intensively Managed Lake Ecosystem (SIMPLE) for Lakes Ontario, Michigan and Huron.

Models need to collect the necessary information in order to make predictions about ecosystem responses. The SOLEC Indicators Development process is establishing a consistent, easily understood suite of indicators that will objectively represent the state of major ecosystem components across all Great Lakes basins, on which to report progress on biennially, and upon which the Parties can be assessed regarding achievement of the purpose of the Agreement. The acceptance and use of a core set of indicators can also drive data collection activities throughout the Basin.

The SOLEC indicators list is meant to be an umbrella of overarching indicators. These indicators will provide a general overview of conditions in the Lakes. In relation to the overarching set, additional geographic area indicators will be LaMP and RAP indicators. These will most likely form the basis of the indicator set, supplemented with indicators from other sources such as the GLFC, SOLEC 94 or 96, the IJC, etc. The SOLEC indicator list was discussed at the October 1998 conference and is now being modified as necessary to produce an indicator list that is mutually acceptable to as many stakeholders as possible.

In support of the development of indicators for the Great Lakes, EPA's Office of Research and Development has an active research program in the Great Lakes Basin. This research is designed to continue to solidify the scientific underpinnings of suggested indicators by studying the relationships between critical biological communities and processes in the nearshore areas of the Lakes. A substantial effort is also underway to improve our understanding of components of the Great Lakes for which there is little past information. For example, ongoing research on the interactions and processes within Great Lakes coastal wetlands will help establish scientifically sound indicators that can be used to monitor the condition of these vital ecosystems.

In addition to research on indicators for the Great Lakes themselves, EPA is also studying the watersheds and landscapes within the Great Lakes Basin. One purpose of this research is to improve our understanding of the impact of changes in tributary water quality and quantity on the Lakes. Indicators of landscape patterns and land use are being explored as a means of rapidly and remotely predicting the ecological condition of tributaries, wetlands, and other water bodies within the Basin. These indicators include those currently being developed and tested in research underway in other geographic regions of the Nation as well as those specifically being developed within the Great Lakes.

ATSDR, in support of the development of indicators for SOLEC, participates on the SOLEC steering committee and shares findings from its Great Lakes Human Health Effects Research Program to be used in the development of human health indicators.

The development of mass balance models and their coordination with monitoring strategies based in part on the SOLEC indicators development process provides an opportunity to enhance our ability to assess the health of the Great Lakes system.

11. Governments identify surveillance and monitoring programs essential to track contaminant loadings to and concentration trends for each of the Great Lakes; provide assurances to the Commission and the public that these programs will be maintained; and provide on a timely basis data and information to quantify load reductions and ecosystem improvements.

The U.S. remains strongly committed to fully meeting the monitoring and surveillance needs required to be able to track and report on the health of the Great Lakes. The Great Lakes program has developed and implemented some of the most innovative and important ecosystem monitoring plans and programs being used today..

The demand for high quality, relevant data concerning the health of various components of the Great Lakes ecosystem has been escalating rapidly for the past decade or so. The U.S. and Canada have spent billions of dollars and uncounted hours attempting to reverse the effects of cultural eutrophication, toxic chemical pollution, over-fishing, habitat destruction, introduced species, etc. Environmental management agencies are being asked to demonstrate that past programs have been successful and that the success of future or continuing programs will be commensurate with the resources expended. At the same time, in both countries, the amount of taxpayers dollars being devoted to Great Lakes environmental issues is decreasing. The demand for high quality data, while operating with limited resources, is forcing environmental and natural resource agencies to be more selective and more efficient in the collection and analysis of data.

The most efficient data collection efforts will be those that are cost-effective and relevant to multiple users. An understanding by stakeholders about what information is necessary and sufficient to characterize the state of Great Lakes ecosystem health through the use of indicators, and to measure progress toward ecosystem goals would facilitate efficient monitoring and reporting programs. An agreed upon set of Great Lakes indicators will help agencies and programs responsible for monitoring environmental conditions to target their monitoring resources in the most efficient manner, and to help policymakers makes the decisions which will be of benefit to all inhabitants of the Basin.

In support of these goals, the U.S. is aligning its monitoring activities around the needs of the resource. To this end, the LaMPs will be developing strategic monitoring plans for their respective lakes which will lead to more efficient data collection. At the basinwide level, monitoring programs such as GLNPO's open lake trend monitoring program, Integrated Atmospheric Deposition Network (IADN), the Great Lakes Research Vessels Database, and those programs which will support the BNS, will focus their data collection efforts on those binationally agreed upon toxic contaminants which are having the largest impact on the Lakes.

The development of indicators through the SOLEC Indicators Development Process can also greatly improve coordination between monitoring programs. By reaching agreement on this suite of indicators, monitoring programs throughout the Great Lakes Basin will be able to align their activities accordingly, which will allow for better reporting on the status of the Great Lakes and for more informed decision-making. It will also allow these programs to identify what monitoring is "necessary and sufficient;" identify any additional monitoring required for reporting on the indicators; and identify monitoring activities which collect data which may no longer be needed to support the selected indicators.

The IJC's report is unclear as to whether the IJC believes that monitoring of biota for persistent toxic substances is a victim of monitoring budget cuts. As mentioned earlier, GLNPO is maintaining its program of monitoring lake trout, walleye (on Lake Erie), and salmon for persistent toxic substances. The list of chemicals to be analyzed for will be expanded in fiscal year 1999. This program helps to provide much of the data needed to track contaminant loadings as indicated by their levels in fish tissue, the principal route of human exposure. There is also an indication that state monitoring budgets are on the increase. New York State serves as an example. There have been no cut backs in New York's routine monitoring programs due to budget cuts from 1993-1997. In fact, the number of times the routine programs monitor the tributaries had actually increased. Environmental monitoring has been accelerated on all fronts with numerous small tributaries, sewage treatment systems, waste sites and other potential contaminant sources targeted with specialized sampling programs designed to locate sources of persistent toxic substances. In addition, biomonitoring has been expanded to several tributaries that had never been sampled before. Special sediment projects were also conducted in a number of tributaries.

The U.S. is also fully committed to collecting and analyzing this data in the most expeditious manner and reporting findings through a variety of outlets, including Internet postings, professional conferences such as SOLEC and IAGLR, through journal articles, and through regular reports such as the *Biennial Progress Report to the IJC*, the *Great Lakes Report to Congress*, and the *State of the Great Lakes* reports.

While resources for surveillance and monitoring throughout the Basin have been impacted to some degree, the U.S. remains confident that it will be able to continue to collect and report on those indicators, both for toxic contaminants and for non-chemical stressors such as phosphorus loadings, habitat and wetlands loss, biodiversity, and exotic species, which will help guide future Great Lakes policies. Through the co-development of indicators and other planning processes, the Parties are achieving better levels of efficiencies in their surveillance and monitoring programs.

PERSISTENT TOXIC SUBSTANCES

12. Governments adopt a three-part strategy relating to: existing commercial operations, including manufacture, import, use and release into the environment; present day combustion facilities; and the legacy of dioxin-like substances from past human activities. Further, Governments adopt and report on a schedule outlining appropriate measures to be taken.

The U.S., through its combined federal, state and local pollution abatement programs, has made major progress in addressing dioxin releases to the environment and will continue to achieve even greater reduction through the implementation of a variety of actions, including the Binational Toxics Strategy. Environmental levels of dioxins have been in decline since the early 1970s. This decline coincides with the major strengthening of U.S. environmental programs. Dioxin reductions have come about in part from broad combinations of programs designed to improve combustion and more effectively manage chemicals and wastes. It is also the result of more recent efforts directed specifically at dioxin as our understanding of the sources has improved. The U.S. recognizes that efforts to reduce dioxin exposure are not yet completed and more needs to be done. Additionally, as our understanding of dioxin sources, exposure pathways, and dioxin toxicology improves, programs will have to respond accordingly.

The U.S. government has taken action to eliminate, or significantly reduce, releases of dioxin-like compounds associated with the manufacture and use of a number of chemical products. These include: discontinuing the use of 2,4,5-T and Hexachlorophene; the manufacturing of PCBs; the elimination of lead from virtually all gasoline sold in the U.S.; and major reductions in the dioxin levels associated with the chlorine bleaching of wood pulp. Additionally, EPA's New Chemicals Program works to insure that new chemicals coming to market do not become new sources of dioxin contamination.

The U.S. is also improving the public's right to know about what chemicals are being used in their communities. A proposed rule is intended to lower the reporting thresholds under section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), also known as the Toxics Release Inventory (TRI), for persistent bioaccumulative toxic (PBT) chemicals and to add certain other PBT chemicals to the section 313 list of toxic chemicals. These PBT chemicals are of particular concern not only because they are toxic but also because they remain in the environment for long periods of time, are not readily destroyed and build up or accumulate in body tissue. Relatively small releases of PBT chemicals can pose human and environmental health threats and consequently these chemicals warrant recognition by communities as potential health threats and as such need to be captured by the TRI Right-to-Know Program. The proposed rule includes several actions necessary to insure that additional information on PBT chemicals is reported under section 313 including a proposal for lowered reporting thresholds for PBT chemicals and special reporting threshold for dioxin. The rule also includes proposed modifications to certain reporting exemptions and requirements for those chemicals that would be subject to the lower reporting thresholds.

As with most industrialized countries, combustion is the dominant source of dioxins in the U.S. Of all combustion processes, municipal and medical waste incinerators appear to be the largest single dioxin source over the last decade. As a result of federal and state efforts, emissions from these sources have been reduced during the 1987-1995 period by approximately 86 percent and 80 percent respectively. These decreases are based on a draft inventory conducted as part of EPA's Dioxin Reassessment. And with the full implementation of MACT rules for these sources, we anticipate dioxin reductions from municipal waste incinerators by about 99 percent and from medical waste incinerators by about 94 percent. These reductions are from pre-regulatory baseline levels. EPA is in the process of developing regulations for all commercial waste

combustion processes. When the current cycle of dioxin-specific waste combustion regulations is completed, EPA expects to have promulgated new rules for municipal waste combustors, medical waste incinerators, commercial hazardous waste incinerators, and cement kilns, and boilers and industrial furnaces burning hazardous waste. Prior to these dioxin-specific regulations, it is thought that significant reductions in dioxin releases from combustion sources were achieved through elimination of the uncontrolled combustion of residential waste in urban areas, the replacement of burning dumps with sanitary landfills, and the general imposition of pollution controls on combustion. EPA continues to look for and characterize additional combustion sources as candidates for dioxin risk management.

The cleanup of areas contaminated by dioxin-like compounds continues to be an important part of EPA's Superfund program. PCB and dioxin-contaminated sites have been some of Superfund's most ambitious projects. These have included Love Canal in New York, Times Beach in Missouri, and Vertac in Arkansas. EPA will continue to address dioxin and PCB-contaminated sites in the context of the overall risk-based priorities of the Superfund program.

One of the most important components of the U.S. response to dioxin is the EPA Dioxin Reassessment effort. This project is a comprehensive review and assessment of dioxin science, including dioxin sources, environmental levels and trends, environmental fate and transport, levels of human exposure and exposure pathways, biological effects, and human risks. The reassessment is addressing the full family of dioxin-like compounds and will assess both cancer and noncancer effects. A draft document was published in 1994 and peer reviewed in 1995. EPA is currently revising the document to incorporate new research and to respond to peer review and public comments. Since 1995, a new dose response chapter has been submitted to peer review as has a revised emissions inventory. Over the next few months, drafting and review of the reassessment will be conducted and a final document released in 2000. Concurrent with release of the final document, EPA will issue a draft Dioxin Risk Management Strategy. This strategy will include a review of existing dioxin risk management efforts in light of the reassessment findings, and will identify any modifications and/or expansions of existing programs needed for EPA to effectively address dioxin risks. An opportunity for public comment on the strategy will be provided before it is adopted as formal Agency policy.

Specific measures identified by the IJC

A. The removal of sediments, contaminated with dioxin-like substances, from bays, rivers and harbors;

Most sediments in the U.S. have detectable levels of dioxin-like substances. It is neither economically nor technologically possible to remove sediments from most of the U.S. bays, rivers and harbors. Consequently, priorities must be established, risks must be assessed, points of diminishing returns determined, and tradeoffs evaluated. The U.S. believes the feasibility of remediating highly contaminated sediments can best be determined on a case by case basis and without a predisposition as to remediation approach (for a more detailed discussion, please see our previous response to recommendation one and two regarding contaminated sediments).

B. The assessment and remediation of chemical landfill sites that contain and release substances with dioxin-like activity;

The U.S. will continue to assess and remediate dioxin-contaminated chemical waste sites through the EPA Superfund Program. Priorities for dioxin and PCB-contaminated sites will be established in the context of the overall risk-based priorities of the Superfund program and other appropriate regulatory programs.

C. The assessment and remediation of emissions containing dioxin-like substances from iron sintering plants and secondary aluminum smelters;

EPA is committed to assessing these two sources, along with other dioxin sources, through its Dioxin Reassessment. The EPA dioxin strategy, which will be released concurrent with the reassessment, will identify Agency priorities for new and additional dioxin action. Iron sintering and secondary aluminum will be considered both in the reassessment and in the strategy. Because no test data existed for U.S. iron sintering facilities, EPA has recently conducted tests at two of these plants. The reassessment is gathering and evaluating all of the available data on secondary aluminum smelters. Until EPA has completed its assessment of these two specific sources and considered the significance of these sources in relation to other dioxin sources, EPA is not prepared to make specific commitments for remediation.

D. Increased recycling of solid waste to reduce precursors of dioxin-like substances to all types of incinerators;

The U.S. supports reductions in the volume of waste through recycling and other waste minimization strategies. Reducing the volume of waste incinerated should result in reduced emissions, including dioxin, from commercial scale waste combustors. The U.S. does not believe there is sufficient scientific justification at this time to support singling out any particular component of the waste stream as being more important in reducing dioxin emissions in commercial scale waste incinerators.

E. Phasing out and retrofitting of existing incinerators, particularly those for medical wastes, with best available technology to prevent formation and release of dioxin-like substances;

This recommendation is fully consistent with the U.S. ongoing program to limit dioxin emissions from waste incinerators. About 50 percent of medical waste incinerators that operated in the mid-1980s have already been phased out. Those that remain will either have to meet the applicable MACT regulations promulgated by EPA in 1997 or cease to operate. MACT is the level of emission control required by the Clean Air Act for certain stationary sources of hazardous air pollutants. Similarly for municipal waste combustors, most of the highest emitting facilities have either already ceased operation or undergone significant modification. All facilities will have to meet the 1995 MACT-based regulations. Emissions from municipal and medical waste incinerators are estimated to have declined by 86 percent and 80 percent respectively, between 1987 and 1995. Regulations under development by EPA for other waste combustion sources will also rely on a MACT approach in establishing regulatory levels.

The implementation of uniform standards for the combustion of hazardous wastes, not only in hazardous facilities, but also in cement kilns, may not be the best approach for addressing emissions at these various facilities. We recognize this, and the Clean Air Act provides for a "residual risk" determination and additional risk-based regulations if needed. As with municipal and medical waste rules, EPA is required to use technology-based determinations to establish regulatory levels. This means that uniform decision criteria are applied to all hazardous waste combustion facilities, including commercial hazardous waste incinerators, cement kilns, and boilers and industrial furnaces. However, because the technologies, economies of scale, and retrofit capabilities may vary from one class of facilities to another, there may be differences in the numerical emission limits established for different facility types.

13. Governments and business apply incentive-based approaches to identify and eliminate specific uses of mercury.

The U.S. is fully supportive of the incentive-based approach and uses it as one of many tools to identify and eliminate specific sources of mercury. Since the 1960s, mercury has transitioned from a commodity for which there were escalating applications and demand within the U.S. economy, to a substance with drastically curtailed consumption. Environmental regulatory costs, for parties subject to these, provide incentive for avoidance of mercury. The promise of wooing green consumers with mercury-free products offers a positive economic incentive to eliminate use of mercury. For such reasons, fluorescent bulb manufacturers, for example, are evolving products with less and less mercury, whereas automakers are using electrical switches which do not rely on mercury. Similarly, many U.S. hospitals and chemical laboratories are looking to purchase products, such as preservatives and instruments, which are mercury-free. The outlook for use of mercury by U.S. manufacturers is that consumption will continue to decline. EPA has many voluntary, incentive-based programs that provide this encouragement.

The Commission requests a tabulation of uses and the quantities of mercury involved, along with a detailed schedule with measurable benchmarks to eliminate each use, be incorporated into the Parties' 1999 report of programs and progress under the Agreement.

In its 1999 *Biennial Progress Report to the IJC*, the U.S. will provide the most recent tabulation of uses and the quantities of mercury involved, as published by the U.S. Geological Survey. It should be noted that these commodity market summaries are reliant upon provision of information by domestic users and sellers of mercury. The U.S. is not committing to eliminate *each* use of mercury. Several uses, such as low-mercury flourescent bulbs, have important environmental benefits, including reducing emissions from power plants; and some applications of dental amalgam do not have satisfactory alternatives. Similarly, some types of batteries which contain mercury have important uses which may not have satisfactory substitutes.

The principal U.S. use of mercury is the production of chlorine and caustic soda by 13 factories which use mercury in their production process. Since mercury is used in the process rather than the product, this consumption is tantamount to some form of loss, primarily via wastes and emissions to air. This industrial sector has publicly declared a commitment to reduce its

consumption by 50 percent from the level of consumption during 1990-1995, which was 160 tons per year. This goal will be achieved by 2006 and adjusted upwards if any factories close during the interim. In addition, one firm with two factories has committed to eliminate all of its mercury losses by 2001. All remaining U.S. mercury cell chlor-alkali factories were built during the 1950s and 1960s; their economic lives are likely to end by 2030, and for many, well before that time. During the remaining years of these factories, the environmental challenge facing this industry is to tighten its process to the fullest extent practical, so as to minimize its mercury losses.

Another major domestic user of mercury is the electrical industry. The U.S. government will open a dialogue with this industry about the practical feasibility of gradually eliminating its reliance on mercury. This is a necessary step in developing a realistic schedule for ending use, as recommended by the IJC. As previously stated, there are some existing economic incentives for the electrical industry to reduce its use of mercury.

The U.S. has set mercury use reduction challenges that apply to society as a whole. In some cases, mercury users have stepped forward to make reduction commitments. However, in many cases, reductions are occurring as the result of technology changes and pollution prevention actions that were not specific commitments. To attempt to set up a detailed schedule of reductions leading toward elimination of each use would be difficult at best and would use up resources perhaps better spent on achieving further voluntary mercury reductions. A special mercury subcommittee under the BNS is working to identify new reduction opportunities and tracking progress.

14. Governments develop a detailed program, including benchmarks and schedules, for the systematic destruction of PCBs in storage, in use and in the Great Lakes environment.

The U.S. agrees with the overall recommendation and is able to report that the recommendation is already undergoing active implementation. PCBs are a serious concern in all the Great Lakes because they are long-lasting and build up in plants and wildlife. They pose a health threat to untrained workers and people who eat contaminated fish from the Lakes. Once these pollutants get into the Lakes, they are very difficult and costly to remove.

Under the BNS, EPA has formed a workgroup focusing on the PCB challenge set out in the Strategy. The Strategy challenge for PCBs states, for the U.S.:

> *"Seek by 2006, a 90% reduction nationally of high-level PCBs (>500 ppm) used in electrical equipment (1994 baseline); ensure that all PCBs retired from use are properly managed and disposed of to prevent accidental releases within the Great Lakes Basin."*

The PCB Workgroup will develop benchmarks and schedules for the systematic destruction of PCBs. The Workgroup consists of representatives of EPA, Environment Canada, Great Lakes States and Provinces, and nongovernmental stakeholders.

EPA included the challenge of reducing the amount of high-level PCBs in electrical equipment since the use of PCBs in this equipment is the last remaining significant use of high-level PCBs and, as the equipment ages, the likelihood of a release increases. Consequently, as long as the high-level PCB electrical equipment remains in use, it is a potential source of PCB contamination to the environment.

However, we disagree with the statement in the IJC's report that the "...(R)emoval of remaining uses of PCBs is not considered cost effective, given the low PCB concentrations in electrical and other equipment." We respectfully request the Commission to clarify further as to which PCB uses this statement applies. For example, this IJC statement on removal of remaining uses would be accurate if it pertains to PCB uses less than 500 ppm.

We also note that the statement on addressing remaining uses of PCBs also contradicts another statement included in the 4th paragraph of the PCBs section of the report which states that the "challenge is to terminate remaining uses." It also contradicts a statement in the last paragraph of the PCB section that "the program should quantify the amount of PCBs still in use." If removal of remaining uses is not a priority, then the statements to "terminate remaining uses" and "quantify the amount of PCBs still in use" would be an apparent contradiction. The U.S. requests further clarification from the IJC regarding these parts of the recommendation.

The U.S. respectfully disagrees with the statements concerning the PCB recommendation in the last paragraph of the PCBs section that the "program" should quantify PCBs in landfills. This would be an extensive effort and it is not apparent what it would accomplish. Indeed, documenting the amount of PCBs still in use, disposed of in landfills and other containments, in sediments, and in the ambient environment would require extensive research and considerable resources. Instead, voluntary reporting by entities that remove PCBs from the environment through proper disposal methodologies could help governments to more efficiently track the amount of PCBs removed from the environment. In the U.S., commercial storers and disposers of PCB waste must provide EPA an annual summary of their activities.

The U.S. is encouraging voluntary actions, in addition to regulatory requirements, to reduce the amount of PCBs which could be potentially released into the environment. EPA Region 5 announced a joint effort with the private sector to inform and encourage small businesses to manage and dispose of PCBs and mercury in an environmentally safe way. The partnership will provide training and information to small businesses, particularly electrical and demolition contractors, and local government agencies to help them identify, handle, transport, and dispose of PCBs and mercury. It also will help provide safe, low-cost disposal by a licensed hazardous waste management firm. In recent years, more and more contracts and insurance policies have specified recycling and environmentally safe job sites.

The U.S. strongly feels that stakeholder involvement from entities that use PCBs or have contributed to PCB contamination (as compared to the development of new government programs), will greatly facilitate the removal of PCBs from the environment. The destruction of PCBs in storage for use, in use, and in the Great Lakes environment is not mandated by U.S. law, whereas PCBs removed from use for disposal purposes must be disposed of within one year of removal from service. Therefore, considerable voluntary activities by both governmental and

nongovernmental entities need to be implemented to continue to make progress in removing PCBs from the environment.

RADIOACTIVITY

15. Governments comprehensively review all monitoring at nuclear facilities in the Great Lakes basin with a view to making the monitoring more accommodating to the needs of the Agreement.

The U.S. agrees that it is important to determine if monitoring in the Basin could better serve the needs of the Agreement. As we do routine reviews of monitoring programs, we will explore ways in which these programs could be adjusted or modified to accommodate the Agreement goals. Our response to this recommendation identifies some of these opportunities

The December 1997 *"Inventory of Radionuclides for the Great Lakes"* (the Inventory) prepared by the Nuclear Task Force of the IJC does not precisely define "nuclear facility," but in context it seems to mean all facilities making use of radioactive materials, whether the facility is part of the uranium fuel cycle (e.g., uranium mine, mill, isotopic separation plant, nuclear generating station, waste fuel handler) or a "secondary source" such as a medical, industrial, commercial, or educational entity. The underlying justifications in the Inventory for the recommendation likely includes the statement,

> "The [radiation] dose assessment models used to derive the allowable discharges [from a nuclear facility] have a very limited relationship to the cycling of radionuclides for development of an inventory."

This is a broad statement, difficult to critique fully, but filled with implications. Notably, it leads to speculation about 'long-term toxicological and ecological problems' (p.92), not made evident by existing monitoring programs. One relevant information source the IJC may wish to refer to is *"NCRP Report No. 109: Effects of Radiation on Aquatic Organisms"* (National Council on Radiation Protection and Measurements, 1991), which seeks to test hypotheses such as expressed in the *"Recommendations of the International Commission on Radiation Protection"* (ICRP, 1979):

> "Although the principal objective of radiation protection is the achievement and maintenance of appropriately safe conditions for activities involving human exposure, the level of safety required for the protection of human individuals is thought likely to be adequate to protect other species, although not necessarily individual members of those species. The Commission therefore believes that if man is adequately protected then other living things are also likely to be sufficiently protected."

As the Inventory notes, nuclear generating stations, pursuant to their U.S. Nuclear Regulatory Commission (NRC) licenses, conduct extensive monitoring of direct emissions and surrounding ambient conditions, with the goal of determining the radiation dose imparted to people through all

pathways (e.g., inhaling airborne radioactivity, ingesting milk and fish from nearby sources, absorbing external radiation).

Numerous examples doubtless are available of components of the biosphere near nuclear facilities which because they are not obviously related to potential human radiation dose are not regularly monitored for anthropogenic radioactivity. Possible examples are mollusks which accumulate radioactive materials in shells, or other benthic invertebrates which are not directly consumed by people. Presuming that such work is not part of existing monitoring and that adequate information does not exist in the available literature on environmental partitioning and biological accumulation of radionuclides, radiological comparison of sediment and organisms near nuclear facilities with equivalent materials elsewhere may well provide indicators of possible ecological impacts.

The EPA and NRC are jointly updating draft guidance based on public comments on *"Guidance on Radioactive Materials in Sewage Sludge/Ash at POTWs"*. The original draft version was made publicly available in May 1997. The document will provide data on typical concentrations of radionuclides in sewage sludge and ash at Publicly Owned Treatment Works (POTWs). Sewage sludge and ash at POTWs may contain both naturally-occurring and man-made radioactive materials. Another document publicly available is the *"Joint NRC/EPA Sewage Survey: Survey Design and Test Site Results"*. The document provides data on typical concentrations of radionuclides in soils, fertilizers, and other commercial materials to allow comparison to concentrations of radionuclides detected in a pilot study of sludges from nine POTWs. Radiation in the environment results from various sources. For example, water moving in or through geologic deposits may contain naturally-occurring radionuclides that travel to water treatment facilities in addition to radioactive materials administered to patients for the treatment of illnesses or other industrial or residential discharges, such as fertilizers. Specific questions can be directed to Robert Bastian and Behram Shroff, EPA respectively at 202-260-7378 and 202-564-9707, or Tin Mo, NRC at 301-415-8151.

The Inventory called specific attention to the 1996 discontinuation of an annual report, prepared by Brookhaven National Laboratory for the NRC which assembled in a standardized format the emissions data from U.S. nuclear power plants. The Inventory went on to conclude that the discontinuation "...represents a serious reporting setback for those groups interested in the radionuclide emissions from U.S. nuclear power facilities." The desire for existing monitoring findings to be put in a consistent form, as readily usable by environmental researchers as possible, at a presumably small cost compared to expanding monitoring, is entirely reasonable; indeed, the U.S. would recommend expanding such a report to encompass both this country and Canada.

Reviewing existing monitoring programs, with an eye toward evaluating whether they are well suited to identifying recognized or heretofore unrecognized "long-term toxicological and ecological problems" (rather than any unidentified, acute human risks) from anthropogenic radionuclides seems reasonable. Making any consequent changes should be considered in the context of the wide variety of other environmental monitoring and research potentially undertaken on behalf of the IJC. The U.S. will look for opportunities for making these changes during routine reviews of existing monitoring programs.

EPA has the longstanding Environmental Radiation Ambient Monitoring System (ERAMS), intended to monitor ambient levels of radioactive pollutants and background radiation. The ERAMS coordinators have always been amenable to analyzing environmental media of concern to researchers or communities near nuclear facilities. The U.S. will explore opportunities to amend the ERAMS program in ways which address the IJC's concerns.

It should be noted that the State of Michigan's Radiation Environmental Monitoring Program, established in 1958 to monitor the environment around Michigan's nuclear power plant sites, found that no public health or environmental radiation impacts due to operation have ever been detected off site. Additionally, for the first time in forty years, the results show only natural background levels, indicating radiation levels from fallout due to past atmospheric testing continue to decline. These levels will provide for a much improved environmental baseline for monitoring nuclear plant impacts. Michigan will update this data annually and make the information available on the Internet at: *www.deq.state.mi.us/dwr*

16. Governments monitor toxic chemicals used in large quantities at nuclear power plants, identify radioactive forms of the toxic chemicals and analyze their impact on the Great Lakes ecosystem.

The U.S. actively monitors a variety of substances used a nuclear power plants through regulatory programs administered by EPA and NRC. Based on the findings of these programs, the U.S. is not aware of any toxic chemicals used in "large quantities" at nuclear power plants. Further, presuming that toxic chemicals at industrial facilities frequently become RCRA hazardous wastes, responses from U.S. nuclear generating stations (as explained more fully below) suggest that only small quantities of "radioactive forms of the toxic chemicals" and radiologically contaminated toxic chemicals are generated annually at nuclear generating plants. However, extrapolating from responses to the 1998 RCRA information request, and there being twelve U.S. nuclear generating stations in the Basin, a total on the order of 1,500 cubic feet of mixed waste may be expected in extended storage in U.S. stations in the Basin. These conclusions are based on the following information.

In January 1998, EPA requested information from 36 Resource Conservation and Recovery Act (RCRA) regulated facilities related to generation and storage of so-called "mixed waste," during the twenty-month period between April 26, 1996, and December 31, 1997. Mixed waste is regulated both by EPA as hazardous waste under RCRA, and by the NRC under the Atomic Energy Act (AEA) as radioactive material. The queried facilities were intended to represent the range of "nuclear facilities" which manage hazardous wastes. Of the twelve U.S. nuclear generating stations (fifteen reactors) in the Great Lakes Basin, only the Davis-Besse Nuclear Power Station (DBNPS) in Ohio was queried; the two queried "secondary sources" in the Basin were a university in the Detroit area and a metal finisher in the Chicago area.

The First Energy Corporation responded that zero mixed waste was generated or stored at DBNPS during the twenty-month period. Further:

> "The DBNPS has a Pollution Prevention and Waste Minimization Plan, which includes mixed wastes. A process change was implemented in 1991 which involved changing from a solvent-based cleaning of anti-contamination clothing to water-based cleaning. This process continues to be utilized which eliminated the generation of mixed waste solvents. Also, hazardous materials use restrictions in radiological areas are emphasized. Administrative controls have successfully eliminated the generation of mixed waste since 1992."

Because of the very limited number of facilities having the necessary RCRA permits and AEA licenses for disposing of mixed wastes, most handlers of radioactive materials go out of their way not to generate such wastes from such materials. Of the fourteen nuclear generating stations queried, four had generated zero mixed waste during the twenty-month period; the remaining ten cumulatively had generated approximately 170 cubic feet, an average of approximately twelve cubic feet per station.

However, having no mixed waste as a remnant of past practice is unrepresentative of the fourteen queried nuclear generating stations, which had a total of approximately 1,700 cubic feet of mixed waste in storage, an average (including DBNPS) of approximately 120 cubic feet per station. While some of this waste ostensibly is being stored for decay (radioactivity often is considered effectively to have decayed to zero after ten half-lives) after which the wastes may be managed simply as RCRA hazardous wastes, a large fraction (perhaps a majority) of the mixed wastes are being held because of limited or non-existent disposal capacity. Inspection of the nuclear generating stations' responses suggests that the largest fraction of the difficult to dispose wastes are radiologically contaminated chlorofluorocarbon solvents and solvent filters generated in the laundering of work clothes, and radiologically contaminated waste paint materials.

By comparison, the response from the Detroit area university indicated 46 drums of scintillation vial waste and 53 drums of liquid waste (which, in context, appears to be scintillation liquid); assuming that one drum typically contains 55 gallons, or 7.35 cubic feet, of material, the university generated a total of approximately 730 cubic feet of mixed waste. The Chicago area manufacturer responded that it had generated or stored no mixed waste.

The 1998 query responses seem generally consistent with findings in a 1992 report prepared by Oak Ridge National Laboratory for EPA and the NRC: *"National Profile of Commercially Generated Low Level Radioactive Waste."* This report identified a total of approximately 140,000 cubic feet of low-level mixed waste being generated or stored during 1990, just less than 10 percent of which came from the 110 commercial nuclear reactors; the predominant mixed hazardous waste type was solvents (84 percent of total).

Both the 1992 EPA/NRC report and responses to the 1998 RCRA information request point to considerably greater quantities of mixed waste cumulatively being associated with "secondary" sources than with nuclear generating stations. In addition, there does not appear to be large volumes of radioactive forms of toxic chemicals from nuclear generating stations.

The U.S. will continue to monitor nuclear generating stations to insure that toxic chemicals are not being used in large quantities and that radioactive forms of toxic chemicals are not being generated in sufficient amounts to cause significant impact on the Great Lakes ecosystem.

17. Governments investigate and report toxicological and ecological problems associated with tritium, carbon-14, iodine-129, isotopes of plutonium and radium.

The U.S. agrees that these substances have the potential to impact the Great Lakes ecosystem and are deserving of a heightened level of awareness regarding these impacts. In responding to the IJC recommendation, the U.S. recognizes that there is considerable information available in the existing scientific literature, most of which focuses on the toxicological impacts of these substances. The literature surrounding ecological impacts of anthropogenic radionuclides seems to be smaller. One source, as indicated earlier, is *"NCRP Report No. 109: Effects of Radiation on Aquatic Organisms"* (1991). A comprehensive literature review could inform any judgement about supporting new research. The U.S. will explore the need for increased research into ecological impacts.

The Commission's Inventory divides radionuclides of special ecological interest into two groups, (I) long-lived radionuclides, arising from natural sources and aspects of the nuclear fuel cycle, and (II) other anthropogenic radionuclides present in the uranium fuel cycle. The Report ranks the first group as deserving of priority investigation.

Extensive literature exists describing the environmental fate and toxicological impact of a range of radionuclides. Much of this work derives from a desire to understand the harmful effects in humans of exposure to the products of nuclear reactions, such as from commercial nuclear reactors and nuclear explosions. Immediately identifiable sources of information on the environmental fate of the radionuclides the IJC specifies include reports from the National Council on Radiation Protection and Measurements; considerable expertise on the human toxicology of radionuclides also resides in EPA's Radiation Protection Division. The voluminous literature on the subject is authoritatively summarized in *"Health Risks from Low-Level Environmental Exposure to Radionuclides: Federal Guidance Report No. 13 -- Part 1, Interim Version"* (EPA, 1998), available on the Internet at:

http://www.epa.gov/radiation/rpdpubs.htm

With the statement (sec. 2.3.2) that "[t]he nuclear fuel cycle is currently the main source of anthropogenic radioactivity emitted to the Great Lakes," the Inventory devotes attention to radium from the mining and milling of uranium, and in particular, to the annual liquid releases from the CAMECO Welcome and Port Granby low-level waste management facilities into the Serpent River, Ontario (these facilities are identified as the only ones in the Great Lakes Basin associated with uranium mining and milling). The average annual radium releases from 1983 through 1995 from the Welcome and Port Granby ponds are 5.5×10^6 Becquerels (Bq) and 7.9×10^6 Bq, respectively (in context, it would seem to be only radium-226).

In addition to being released during uranium milling and refinement, radium-226 is a common, naturally occurring constituent of groundwater; the Maximum Contaminant Level (MCL) allowed by EPA under the Safe Drinking Water Act is five picocuries per liter (pCi/L) (0.185 Bq/L). It may be useful to compare the amounts released from Welcome and Port Granby to those introduced into surface water from common groundwater use.

Assuming that drinking water is supplied at precisely the MCL to a hypothetical 100,000 people using 75 gallons per day per person, the annual radium-226 throughput would be approximately $1{,}900 \times 10^6$ Bq -- more than 100 times the combined annual release from Welcome and Port Granby. Further, considerable radium-226 may be removed from groundwater before distribution, either in a deliberate attempt to reduce radium or as an inadvertent consequence of reducing suspended and dissolved solids. Settling flocculated and precipitated solids is a common groundwater treatment method. At some drinking water treatment plants, the resultant sludge may be scooped up and managed as solid waste; at others, the sludge may be slurried into a sewerage system and thus add radium to that discharged from the treated throughput. Groundwater treatment sludge, especially where radium removal is inadvertent, well may represent a significant and largely unevaluated risk to waste handlers.

If the intent of the Nuclear Task Force in indicating radium as deserving of further study is to trace the fate and possible harmful impacts of radium from the uranium fuel cycle, the U.S. recommends that attention should be paid to radium from groundwater as a significant, perhaps insuperable, confounding factor. We will examine ways by which this determination could be made.

SOCIAL AND ECONOMIC ASPECTS

18. Governments structure a transition study and develop a transition model by December 31, 1999, for one of the chemicals presently under investigation through the Great Lakes Binational Toxics Strategy.

The U.S. fully agrees with the Commission that an equitable and deliberative transition process is necessary, putting into place the policies that can contravene negative impacts, and involving all sectors. However, the U.S. does not believe that an additional transition study or transitional model will help us progress towards virtual elimination, and therefore we do not fully support this recommendation. Rather the U.S. believes that the processes currently in place serve the same function as a new study or model. In order to best evoke change, we need to put our energies into the existing efforts.

Specifically, the process being conducted under the Binational Toxics Strategy (BNS) contains elements of what would be included in a “transition planning” model. Many of these elements are currently contained in the four step process by which the BNS identifies candidate chemicals for inclusion.

In the U.S., of the twelve Level I substances listed, five are banned or canceled pesticides under the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) and one is a banned substance (PCBs) under the Toxic Substances Control Act (TSCA). Through these regulatory processes the targeted chemicals have, for the most part, been removed from U.S. commerce. The regulatory and legal processes which led to these bans and phaseouts are the most powerful U.S. methods of transitioning substances out of societal use. These bans and phaseouts may be followed by actions by other regulatory programs which may include aggressive clean sweep programs to collect and properly dispose of stockpiles of these substances or remedial activities to remove the contaminants already in the environment.

The challenge remains how to equitably and deliberatively transition the chemicals currently in use towards virtual elimination. The BNS sets up a transitional framework. We are writing reports to document achievements on the chemical challenges identified in the strategy, and to communicate the state of knowledge for the targeted chemicals, including, as appropriate, the regulatory framework, sources, and pollution prevention and reduction opportunities.

A true transition is best put in place in collaboration with stakeholders. Those who use the targeted chemicals know their industrial and manufacturing processes best, and therefore are well suited to figure out how to virtually eliminate these chemicals of concern.

An important element of the transition is working on a sector by sector approach. The U.S. is working toward this goal by engaging industrial sectors directly, through Project XL and others, to help define and promote innovative approaches to prevent pollution while remaining economically strong. We are also actively pursuing strategic partnerships with industrial sectors. Examples of these include our work with the American Hospital Association, the steel industry in Northwest Indiana, and the chlor-alkali industry.

The U.S. will continue to work closely with a variety of stakeholders and sectors under the BNS process as well as the National Persistent Bioaccumulative Toxics Strategy. We will continue to ensure that we communicate our progress on the BNS through the reports, the Internet and other methods. This communication is a crucial aspect to conveying our progress on the transition taking place in the basin.

19. Governments commission a study to evaluate the practical value of utilizing the ecological economics approach.

The U.S. agrees with the utility of using economic modeling to assess environmental impacts to the Great Lakes ecosystem. However, the U.S. has reservations about endorsing an ecological economics study without knowing more about the approach to be taken. While in accord with the ecological economics motivation to acknowledge more broadly the contributions ecosystems make to social welfare, ecological economics research has been advancing in many disparate directions, some promising and others less so. While piloting an ecological economics study in the Great Lakes Basin may potentially be a sound investment, the U.S. position is that any approach proposed must be well defined and acceptable to the mainstream of environmental economists and ecologists.

The U.S. believes that the ecological economics is more of a fresh perspective than a discipline in its own right, forcing reconsideration of some of the simplifying assumptions in applied welfare economics. Most work under the rubric of ecological economics is economic research that places new emphasis on the complex interactions and interdependencies between ecological and economic systems. Many economists and interdisciplinary teams have focused their analytical efforts upon accounting for and valuing the less familiar, though highly significant, ecosystem services (e.g., recreation, flood mitigation, and biodiversity). Analytical methods under development include natural resource accounting (El Serafy, 1997), indicators of value (King and Crosson, 1995), bioeconomic modeling (Barbier, 1994), and quasi-option value pricing (Coggins and Ramezani, 1998). In accord with the conventions of welfare theory, the approaches are conducive to policy analysis. They permit comparison of actual and baseline states to gauge the increment of ecosystem service gained or lost through an action or activity.

Some ecological economic attempts at valuation, however, appear to misapply economic concepts to estimate substantial sums both misleading and ill suited to policy analysis. In particular, the "total valuation" approach seeks to estimate the value of an entire class of ecosystem using either the cost to provide an engineered replacement for the services provided or the revenues generated from the services (e.g., Costanza et al., 1997; Ehrlich and Ehrlich, 1997; Pimentel et al., 1997). On the one hand, this application violates the necessary conditions to use the replacement cost method (an otherwise bonafide valuation technique). For example, individuals must be shown willing to incur these replacement costs. On the other hand, revenues from ecosystem services bear little relation to the social benefits measure that is of interest. Moreover, the issue of double counting surfaces when total valuation is used to value a region's ecosystems because the services of one ecosystem may substitute for another's. These and other methodological critiques to total valuation are well documented (e.g., Bockstael et al., 1998; Sagoff, 1997; Simpson, 1998; and Toman, 1998).

It would seem that total value estimates serve no practical purpose for decision making because total valuation assumes a "zero" baseline. Few regulations result in the complete loss or recovery of an ecosystem or service. As for more likely policy questions, the estimates are unable to say anything about incremental changes in service flows.

While this approach is not currently being used in the Basin, less contentious valuation methods are being applied. One ongoing effort by EPA to assess benefits comprehensively is in the context of water quality improvements to Lake Erie. To answer the question of what abating pollution to Lake Erie has done to improve social well-being, the physical and ecological effects of regulation are first being estimated. Valuation methods will then use these data to monetize the change in services flows attributable to environmental regulation.

This study is proceeding in several steps: First, pollutant loadings to the lake are being estimated for two scenarios, current conditions and those absent pollution controls. An existing eutrophication model is being updated to take advantage of recent advances in water quality modeling to estimate the extent of hypoxia and anoxia in the lake for both scenarios. These data will then be applied to a bio-energetics model to quantify the difference in fish survival and growth resulting from regulatory actions to date. Last, behavioral models, such as recreation demand models, will convert these effects into measures of welfare useful for policy analysis.

Appendix I: References For Specific Recommendations

References for Recommendation #8

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References for Recommendation 19

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Appendix II: Suggested Corrections to Text of Report

Pg. 16, 4th paragraph - The suggestion is made that governments are moving away from regulation toward voluntary efforts, and that this may be a cause for concern. However, it should be noted that the U.S. Great Lakes Initiative will impose new, more stringent regulations to protect both human and wildlife health.

Pg. 17, 2nd full paragraph, CERCLA - The text incorrectly states that a U.S. waste site cannot be listed or remediated unless a potentially responsible party (PRP) can be identified. One of the most important aspects of the Superfund Program is that cleanups are initiated regardless of whether or not a PRP exists. The text goes on to state that some of the highest priority U.S. waste sites are not addressed and that "no alternative mechanisms are in place to address the many contaminated sites that await action throughout the U.S." No mention is made of state Superfund programs or other remedial tools that exist to deal with waste site issues. The IJC's description of the CERCLA program contains additional inaccuracies. EPA would gladly welcome the opportunity to inform the IJC regarding how the CERCLA program effectively employs a number of tools to protect the public and the environment from uncontrolled releases of hazardous substances.

Pg. 19, lst bullet & following page - The U.S. 33/50 program, a voluntary waste reduction program which ended in 1996, is discussed as if it is still an active program.

Pg. 34, The major Lake Michigan tributaries, including those in Michigan, were intensively monitored during 1994 and 1995. Although routine monitoring of Michigan tributaries has been curtailed, some special projects have included tributary monitoring.

Pg. 37, first bullet item - The suggestion that Lake Ontario <u>currently</u> receives 90 percent of its dioxin/furan loads from sources within the Basin is based on an inappropriate interpretation of sediment core data collected by Pearson et al. 1997. It is well understood that the levels of contaminants in the environment in water, biota and sediment do not change to zero the moment that all contaminant inputs are removed. Under a "zero load" scenario, contaminant levels in the system undergo a first order rate of decrease in most environmental media. This is basically what the Pearson et al. data shows for Lake Ontario. Levels of dioxins/furans have been in the process of decreasing for well over a decade. The sediment core data shows the system is responding to decreases to past 1970s reductions in dioxin loads to the system and do not only reflect <u>current loads</u> to the system. A more complete review of a wide variety of environmental data would be required to compare or contrast the relative importance of current sources. The Niagara River Upstream/Downstream Monitoring Program finds current levels of dioxin/furan entering Lake Ontario to be at nondetectable levels.

Pg. 38 - Comment on the mercury narrative: second sentence--"Today, only one mercury cell facility is still in operation in the Great Lakes Basin." There is a Vulcan facility in Port Edwards, WI and an Ashta Chemical facility in Ashtabula, OH.

Pg. 41 - The report somewhat overstates the significance of the issue of radioactivity as a current environmental problem. On page 35 it is listed along with PCBs, dioxins and mercury as a substance that is posing a problem. The IJC December 1997 report on radioactivity did not identify any specific environmental problems due to radioactivity.

The IJC may want to consider correcting the record regarding the status of monitoring of New York's Great Lakes tributaries and the scope of the Superfund Program. Considering the magnitude of the error, a formal correction may be appropriate. Alternatively, the IJC could allow EPA Region 2 and/or New York State to develop an article for their *Focus* magazine to describe the very advanced level of environmental monitoring that is being undertaken in New York's Great Lakes Basin, toward the goal of virtual elimination. The inaccurate statements regarding the CERCLA program could also be corrected in such an article.