**Response to 2002 IADN Peer Review Panel**
**IADN Steering Committee**
**June 2004**

**We would like to thank the members of the panel for their efforts in reviewing the IADN program in November of 2002. The Steering Committee (SC) offers the following responses to the panel. We see the panel's report as fundamentally positive. However, we know there is room for improvement, and many of the panel's recommendations have been incorporated into the Third Implementation Plan for IADN (IP3), which is now being presented for comment by the panel and Great Lakes stakeholders.**

General recommendations from the panel's report are followed by the Steering Committee's response.

**Recommendation: IADN should take on more of the research described under Part 2 of Annex 15.**

IADN falls under Parts 3 and 4 of the Annex ("Surveillance and Monitoring" and "Components of the Integrated Atmospheric Deposition Network") and is funded to do surveillance and monitoring, as explicitly stated in the 1997-2002 Technical Summary provided to the reviewers (Section 1.3.1). These sections call for the Parties to use IADN to identify persistent, bioacccumulative, toxic compounds (PBTs) and their significant sources and to track their movements; determine atmospheric loadings; define temporal and spatial trends in atmospheric deposition; and develop Remedial Action Plans (RAPs) and Lakewide Management Plans (LaMPs). The tasks given in Annex 15 as a whole (including studying health effects and developing pollution control measures, named in Parts 2 and 5, respectively) are to be performed by "the Parties", namely the United States and Canada. IADN has been designed to fulfill part of Annex 15. It does not have the resources or the expertise to address all tasks of Annex 15.

IADN cooperates in some research, but other research in the area of atmospheric deposition and PBTs is taken on under other umbrellas—for example through ORD STAR grants and through EPA Region 5's Great Lakes Air Deposition (GLAD) grant program. As defined by Annex 15, IADN is a *surveillance and monitoring* network; however, many research questions have been answered using IADN data, as shown by numerous publications in the peer-reviewed literature. IADN Steering Committee members do routinely participate in other aspects of Annex 15. They can, and commonly do, advise those who work in pollution prevention and control on what progress has been made and where, in general, the source regions are located. (We are not in the business of source emissions monitoring, so we cannot pinpoint specific sources). IADN data are regularly given to and used by Lakewide Management Plan (LaMP) managers and Binational Strategy workgroups to track progress and make decisions. For example, IADN PAH data and source receptor work and mercury data collected under the CAMNet program at Canadian IADN stations has been shared at BNS meetings. In another instance, IADN data and the PSCF maps were used to make the case to EPA Headquarters officials to accelerate PCB electrical equipment decommissioning and investigate other remaining sources of PCBs in urban areas.

This type of outreach to stakeholders needs to be continued and IADN SC members will continue to contribute to pollution reduction discussions.

In addition, the SC agrees that partnerships should be pursued with modelers and other parties who can use IADN and other data to track the movement of PBTs and locate sources.

Given more funds, IADN (via EPA GLNPO and Environment Canada) would sponsor or cooperate in more research outside of IADN, but currently year-to-year funds are generally only sufficient to maintain the core IADN program.

**Recommendation: IADN should consider establishing an external scientific advisory group to advise IADN on a regular basis.**

Opinions within the Steering Committee on this topic were varied. While most viewed the idea as a good thing, some questioned whether there would be sufficient tasks for the panel to perform on a regular basis. The peer review panel acts as an advisory panel at the end of each Implementation Period, and the peer review panel has and should include international experts. As needs arise, ad-hoc advisory panels shall be convened to address specific tasks (such as improvement of the IADN loadings model). These panels shall include international experts with knowledge relevant to the tasks at hand.

The Steering Committee agrees that more international collaboration and spreading awareness of IADN is desirable.

**Recommendation: IADN should perform a mass balance of inputs of PBT chemicals to the Great Lakes, including inputs from sediments and tributaries and atmospheric deposition to the land mass of the Great Lakes basin.**

The U.S.-Canada Binational Toxics Strategy has a goal of virtually eliminating PBTs, regardless of their origin. The view is to find sources and deal with them on a case-by-case basis; therefore; detailed mass balance information would not necessarily help in management of sources. Preliminary results from the Lake Michigan Mass Balance (LMMB) demonstrated that about 80% of the inputs of PCBs to the Lake were via atmospheric deposition, and this is most likely the case for other banned or restricted semivolatile PBTs. Efforts are underway in both the U.S. (through GLNPO and the new Great Lakes Legacy Act) and Canada to clean up contaminated sediments in the Great Lakes and their tributaries. As sediments are cleaned up, the atmospheric contribution will only become more important.

Tributary monitoring data, apart from that for the Niagara and St. Lawrence Rivers, is not available and would be expensive to obtain. There is data from 1994-95 from the Lake Michigan Mass Balance Study for some Lake Michigan tributaries. IADN does not have the resources to obtain tributary data for other rivers and certainly not on a regular basis. This is not to say that tributary loads are not important, but they are beyond the scope of what IADN, as an air monitoring network, was intended to do.

The panel suggests that a project similar in scope to the Niagara-on-the-Lake workshop that produced the Strachan and Eisenreich 1988 report (the "mauve document"). The IADN SC will consider holding a similar workshop to update the findings of the 1988 report. However, it is likely that data for many tributaries would not be available. Some sediment data is available from Areas of Concern and open lake sediments and would require modeling to determine inputs to the Lakes from the sediments based on this data. The Panel noted that such mass balancing estimates would only have to be "qualitatively correct", and it is possible that given the aid of a student or other manpower that this could be done. Final modeling results from the Lake Michigan Mass Balance study are becoming available, and these results could give insight into relative inputs that could be applied generally to the other Lakes.

Deposition to land, apart from the relatively small amount that subsequently reaches tributaries and the Great Lakes, would not necessarily be useful in making management decisions. Overall trends in deposition to land most likely mirror inputs to the water, so tracking inputs to the Lakes gives an indicator on progress made in reducing deposition to land masses. Deposition to land also affects foodstuffs grown in the basin, but the SC feels that estimation of exposure via this pathway is beyond the mission of IADN. Dioxin data from the U.S. EPA's National Dioxin Atmospheric Monitoring Network (NDAMN) will be used to examine this question—specifically, dioxin and coplanar PCB deposition to plants in agricultural areas and subsequent contamination in meat and dairy.

The Steering Committee feels that given the limited resources and manpower within IADN, as well as IADN's mission as set out in Annex 15—to determine atmospheric loadings to the Great Lakes System, defined by the GLWQA as "streams, rivers, lakes, and other bodies of water…"—that it would be more appropriate and useful to decision-makers to focus on improved assessment of atmospheric inputs, particularly urban inputs.

**Recommendation: IADN should develop a strategy for determining urban atmospheric inputs to the Lakes in a scientifically credible manner.**

The Steering Committee strongly agrees that more work must be done in this area, and we have already started implementation of an urban strategy. The Chicago station has been in operation since 1996 (and prior to that as part of the LMMB study), and it has provided key data that has helped us to determine Chicago's approximate contribution to Lake Michigan loadings. After we observed the significant influence of Chicago, we made a decision that we feel makes the greatest use of our resources and moved sampling equipment from the rural site of Brule River, WI to Cleveland, OH at the end of 2002. Work is also ongoing on the ECO-buoy on Lake Ontario in proximity to Toronto.

Spatial gradients within cities have been explored (Basu et al. IAGLR 2003). A temporary site set up at the University of Illinois at Chicago in 2002 revealed levels of PCBs about twice that at the routine site at IIT. This confirms the assertion of significant urban spatial gradients made by the panel; however, this does not make the urban data we do collect any less valuable (versus not collecting any at all).

Air sampling in urban plume areas is feasible given available funds and ship time. The SC also intends to explore the use of passive samplers to aid in determining spatial gradients in cities and making measurements in cities other than Chicago and Cleveland. This work has already started in collaboration with Dr. Tom Harner of MSC, a leading expert in passive samplers technology and applications. We will continue to pursue opportunities to perform such studies, which would require at least moderate funding.

PAH and dioxin/furan data are available in Canada through the National Air Pollution Surveillance (NAPS) network for Toronto, Hamilton, and other sites on the industrialized western end of Lake Ontario. Data from Environment Canada's research buoy on Lake Ontario could also eventually be used for estimation of urban inputs. As part of the Lake Ontario Atmospheric Deposition Study (LOADS), samples near urban areas on Lake Ontario were also collected.

IADN will attempt to use the data listed above and other available urban data to assess urban inputs to the Lakes. Modeling expertise within Environment Canada could also assist in better estimating urban inputs given the spatial gradients that exist in metropolitan areas. Assessing urban inputs has been and will continue to be a priority area of work for IADN.

**Recommendation: IADN should improve its loadings estimates to the Lakes via the use of improved physical-chemical and deposition process information, less averaging of data (including meteorological data), and inclusion of estimates for loadings from other pathways (mass balancing). The program should be more honest about errors and uncertainty in the loadings estimates.**

The issue of mass balancing was discussed earlier in this response.

Several recommendations from the peer review panel have been implemented in the latest loadings estimates for 1999-2000. Increased focus was placed on reporting downward loadings separately from volatilization, monthly calculations were done to avoid aggregation of meteorological and concentration data, calculations are now performed in SAS where the data are taken directly from RDMQ, and over-lake meteorological parameters were employed. Volatilization terms were calculated for PBTs where water concentration data were sanctioned by IADN experts as being of good quality. Henry's Law Constants were updated. Relative errors in the estimates are discussed and blank loadings have also been calculated to provide a measure of the uncertainty for the estimates. The next major improvement to the loadings model will be that of the dry deposition term and will be implemented in the next report. The SAS loadings program should also help in consistency of calculation, recording of any changes, and the speed with which is takes to get loadings estimates out.

Modeling expertise regarding loadings has been sought at MSC and collaboration with Dr. Jianmin Ma is ongoing. An expert panel may be convened to review and improve the loadings model.

Efforts are also being made to improve the reliability of Canadian water data, particularly for PCBs for Lakes Superior, Huron, Erie, and Ontario. In 2003, EPA reinstated water monitoring

for organics on Lake Michigan. Volatilization estimates should improve given these advances in the water data.

**Recommendation: Revamp the chemical nomination process so that it is widely publicized, make two classifications for recommended substances, one more selective than the other, and prepare a biennial report on nominations and listing/delisting of chemicals.**

The panel noted that there may be skepticism that nominations will be considered seriously. The truth is although the recommendations themselves would be taken seriously, funds are often not available to fund them. The panel provided a list of chemicals that should be added to IADN (comprehensive mercury monitoring, PBDEs, dioxins and furans, chlorinated naphthalenes, current use pesticides, etc.). All of these chemicals have been discussed by the Steering Committee as candidates for addition in the past. The major barrier to addition has been funding rather than awareness.

However, we agree with the panel that stakeholders should be able to make recommendations of chemicals relatively easily, while at the same time providing the SC with the necessary information and justification.

The Steering Committee plans on simplifying the nomination process and making it an outreach activity that occurs periodically.

**Recommendation: IADN should add existing priority chemicals and chemicals of emerging concern to its analyte list, and consider delisting some of the "old" organochlorine pesticides.**

Mercury. Gaseous mercury and mercury in precipitation is being measured at Canadian stations through the Canadian Atmospheric Mercury Network (CAMNet) and the Mercury Deposition Network (MDN), respectively. The ultimate goal is to have speciated mercury monitoring at the U.S. stations as well. This has been the case for several years, but a lack of funding has been a major barrier. On the U.S. side there is also the issue of training the site operators to operate and troubleshoot the Tekrans, particularly for the Chicago and Sturgeon Point sites that have student operators who rotate every couple of years. Given no new resources, an alternative would be to try to obtain mercury data from Great Lakes states that sponsor MDN sites and operate Tekrans in the basin. The U.S. will continue to pursue funding for making mercury measurements at its stations.

PBDEs and dioxins. PBDEs will now be measured in precipitation at Burnt Island, Point Petre, and perhaps other Canadian stations. In Canada, collaboration with the National Air Pollutant Surveillance Network (NAPS) has provided dioxins and furans air data at the two Canadian master stations, and since the spring of 2004, dioxin has been measured in precipitation at those stations as well. Indiana University has obtained funding from the Great Lakes Atmospheric Deposition (GLAD) program to add dioxin to the U.S. master stations and Chicago for two years starting in the fall of 2004. PBDEs will also be measured at U.S. stations.

Current-use pesticides. MSC has been funded to monitor current use pesticides in air, water, and precipitation for two months each for the years 2003-2005 through the Canadian Atmospheric Network for Currently-Used Pesticides (CANCUP).

Metals. Since metals are not measured on the U.S. side and resources are limited, EPA will look into obtaining metals data from other air monitoring programs (PM, criteria pollutant sites, etc.). If resources become available for mercury monitoring, metals measurements at U.S. sites may be pursued to provide source signature information.

De-listing organochlorine pesticides. The IADN listing and de-listing philosophy has relied heavily on ecological and/or human health significance. One reason that the "old pesticides" are still being measured is because data from US EPA GLNPO's fish contaminant monitoring program indicate that levels in fish are still above health protection values (although this is not always reflected in state-issued fish consumption advisories). IADN data for OC pesticides will also be useful in monitoring global progress with regards to eliminating their use in other areas of the world. Delisting or reduction of sample frequency may occur once these chemicals are seldom detected in air and/or are below health protection values in fish.

**Recommendation: To improve precision, have analyses for each separate chemical group performed at a single laboratory for all sites (as opposed to the current situation where all samples from each site are analyzed by the laboratory in the sponsoring country).**

The IADN SC has considered the "one lab-one chemical group" approach before. It has long been felt that the multiple laboratory configuration prevents potential biases from going undetected. In addition, the long-term trend at each station has been strengthened by generally having laboratory consistency since the inception of IADN. IADN trend information is routinely used by managers and decision-makers.

The Steering Committee is currently conducting experiments to determine the causes of interlaboratory differences and is actively working to resolve them so that data is more comparable between countries.

**Recommendation: IADN should reduce data turnaround time and time to reporting. Data availability should be improved. IADN should balance publication efforts, with more effort coming from Canadian IADN scientists, and encourage binational publication.**

Indiana University is generally submitting data to the IADN data manager less than a calendar year after the end of the sampling year, allowing data to be quality controlled by 12 months following the last sample collection, as recommended by the panel. Data delivery has improved on the Canadian side, and MSC management is being proactive about continued improvement in this area.

During IP2, data requests had to go through the IADN data manager via the IADN website. This process will be upgraded to fully utilize the capabilities of Canada's NAtChem (National Atmospheric Chemistry) database that in the near future will allow direct web-based access. Data will be sequestered for a period of 2 years after submission to NAtChem to allow the

preparation of publications by the Steering Committee and then will become public. This data policy is aligned with that of other networks such as the Northern Contaminants Program (NCP), CAPMon (Canadian Air and Precipitation Monitoring Network), and CAMNet. Summary data and IADN publications will remain accessible via the IADN website.

The new SAS loadings program should assist in getting loadings results out more quickly. The recent appointment of a Canadian IADN PI, after a long vacancy in this position, as well as a MSC research scientist to work on IADN, should help balance the U.S.-Canada publication record as well as encourage binational publications in the peer-reviewed literature.

Press releases covering IADN results have been successful in garnering media coverage in the past, and the IADN Steering Committee will continue to pursue such opportunities.

**Recommendation: Link IADN to other national and international monitoring and research networks.**

IADN peer review panels and ad-hoc advisory panels that include international experts will help create linkages to other monitoring programs. International collaboration has also been initiated with a German-Canadian intercomparison whereby EMEP samplers have been installed at an IADN master station (Point Petre, where Indiana University is also collecting samples) for a one-year study. Canadian scientists will travel to Germany and Russia to discuss monitoring results and incorporation of the data into modeling exercises led by MSC-East.

Members of the IADN Steering Committee also attend international and national POPs meetings, and links are being made via networking at these events. In addition, IADN scientists are also participating in development of the U.S. PBT Monitoring Strategy and in implementation of the Commission for Environmental Cooperation's Environmental Monitoring and Assessment North American Regional Action Plan (NARAP). The Steering Committee understands that we must make an effort beyond the status quo in this area.