

**April 27, 2010**

**Comments/Responses on Draft Great Lakes Regional Collaboration Mercury Emissions Reduction Strategy**

**Public Comment Period - November 12, 2009 to January 12, 2010**

Alliance for the Great Lakes

1. Comment: The Alliance supports the Strategy's recommendations, with the exception of Recommendations 33 and 34, which are "totally inadequate for implementation of this vital Strategy." These recommendations should be replaced with the following:
  - o The signatories must commit to deliver on all the reduction deliverables;
  - o A lead agency in each Great Lakes state and in USEPA must be identified to address each action item;
  - o Action items should be prioritized;
  - o A public tracking, progress reporting and accountability structure must be created;
  - o Aggressive implementation of existing regulatory programs must be incorporated as a method for achieving further reduction.

The Alliance also calls on the Strategy to prioritize implementation of reducing emissions from coal-fired power plants.

Response: Given current state budgetary constraints, it is not feasible for every Agency to commit to implement all of the Strategy's recommendations, though all of the participating agencies agree that they should be implemented. We agree that it is important to designate leads in each Agency and to prioritize action items. However, these tasks are the responsibility of individual agencies, not of the Great Lakes Regional Collaboration or the Strategy team. State environmental agencies have primary responsibility for Strategy implementation, and states will legitimately have differing priorities because of differences in their existing source inventories, legal authorities, and status of mercury reduction efforts already underway. We agree that aggressive implementation of existing regulatory programs is vital and many of the Strategy recommendations involve implementation of existing regulatory programs.

2. Comment: The Strategy should address direct water discharges of mercury to the Great Lakes basin, and should lead to more aggressive implementation of water quality standards. The Great Lakes should states review the current status of mercury controls at the largest mercury dischargers.

Response: We agree that State environmental agencies should review the current status of mercury controls at the largest mercury dischargers. However, such a review is

outside the scope of this project. The Great Lakes Regional Collaboration called upon EPA and the Great Lakes States to develop a strategy for reducing air emissions of mercury, not water discharges. Given long-range transport of mercury emitted to the air, it is particularly important to achieve regional cooperation on reducing air emissions.

American Iron and Steel Institute (AISI) and the American Coke & Coal Chemicals Institute (ACCCI)

3. Comment: "A "strategy" implies actions that need to be taken in the future, but many of the recommendations to the states simply catalog actions that are already in place and are not prospective or particularly germane. For example, with respect to Recommendation 10, the major steel plants in Northwest Indiana participated in a voluntary program, in cooperation with federal and state agencies, to phase out the use of mercury devices, and inventories of mercury required to service those devices, and reported substantial progress in its 2004 report on that program. Those efforts continue to be implemented, and an updated report is being prepared on additional progress toward the ultimate goal of a 90% reduction under that voluntary program. Other industry groups have similarly implemented voluntary programs to phase out the use of mercury-containing devices.

Response: We agree that many praiseworthy actions have already been taken to implement some of the recommendations in the Strategy. However, we believe that there is more to be done. Many of the recommendations have been implemented by some of the Great Lakes states but not by others. Similarly, some companies, such as the steel plants in Northwest Indiana, have voluntarily taken action to reduce mercury use and manage mercury wastes responsibly. Other companies have not. Recommendation 10 calls for state implementation of actions to phase out mercury-containing devices and to promote mercury removal from end-of-life vehicles and appliances. While the actions cited by AISI and ACCCI are important, there are still mercury containing devices that have not been phased out and organizations that are not disposing of mercury properly.

4. Comment: With respect to Recommendation 11, the U.S. steel industry was instrumental in a collaborative effort with USEPA, environmental groups, scrap dealers, auto dismantlers, and automobile manufacturers in establishing the National Vehicle Mercury Switch Removal Program (NVMSRP), which is now being implemented by states nationwide. The management body for the NVMSRP has documented removal of millions of mercury switches over the past three years and the program is ongoing. USEPA has recognized and acknowledged the success of this program. Moreover, the program is codified in the Electric Arc Furnace Area Source Rule, which mandates participation in the NVMSRP or documentation of equivalent scrap management practices. USEPA is also currently drafting revisions to the Iron & Steel MACT Rule to include similar language that will cover scrap management practices for Basic Oxygen Furnaces as well. States with authority to administer federal air regulations have no choice but to incorporate these requirements in permits.

Response: We agree that the NVMSRP is an important program and that the regulations placed on iron and steel production facilities require steel producers to implement scrap management practices to remove mercury. We discuss these programs in the Strategy. However, the majority of auto switches are still not being recycled; according to information developed by the NVMSRP, approximately one-quarter of the mercury switches in autos retired in 2008 and 2009 were collected under the program. While these collections are a significant achievement, clearly improvements can be made. Moreover, the NVMSRP data show wide variation in the percentage of switches being collected in different states, suggesting that state action can have an important impact on the success of NVMSRP. Some states have found that an effective approach for increasing mercury switch removal is to “include permit conditions requiring proper management of scrap that is likely to contain mercury switches at metal shredders,” as Recommendation 11 states. This approach would legally require that metal shredders who supply scrap to steel production facilities also have effective scrap management plans.

5. Comment: With respect to Recommendation 13, taconite production plants are subject to the Taconite Processing MACT Rule. Mercury emissions from taconite processing were evaluated when that rule was developed and it was concluded by USEPA that no mercury limitations were necessary or justified. It is inappropriate to put forth a recommendation to adopt on a region-wide basis a particular state's voluntary mercury reduction program, such as that in Minnesota, that supersedes a federal MACT rule that was based on a thorough analysis of the environmental impacts of emissions from those sources and the economic implications of imposing additional controls. Regarding the recommendation's reference to the Minnesota TMDL, USEPA has developed guidance for mercury TMDLs and that guidance should be the basis for implementing TMDLs as opposed to state plans that may not comport with EPA's guidance.

Response: Recommendation 13 states that “States that have taconite production plants should promote participation by these plants in the voluntary mercury reduction activities outlined in the Strategy Framework for Implementation of Minnesota’s Statewide Mercury TMDL Implementation Plan, which strive to reduce emissions by 75% by 2025.” USEPA found in 2003 that it was unable to set a floor standard for mercury that was “achievable” under section 112(d)(2) of the Clean Air Act. However, this finding does not conflict with the determination of the Minnesota Pollution Control Agency and the Mercury TMDL Implementation Oversight Group in 2009 that it is appropriate and feasible to reduce mercury emissions by 75% by 2025. These reduction efforts will be supported by research on control technologies overseen by a mercury-reduction research and implementation council created by the ferrous mining and processing industry. Implementation of recommendation 13 would lead to the participation of taconite production facilities in Michigan (the only state other than Minnesota that has taconite mining and processing) in these research and implementation activities. We believe that the process, and the taconite industry, would benefit from the participation of Michigan industry.

6. Comment: Recommendation 15 implores states to impose effective controls for mercury emissions at new coke oven facilities. Permits for new coke ovens that have been built in recent years (none in the Great Lakes Basin) have included mercury limits that will constitute BACT for new and modified sources. As such, any new coke ovens in the Great Lakes region would be subject to controls demonstrated as BACT at the recently built batteries.

Response: We agree with this characterization of the recommendation and of the situation with respect to the requirement for BACT at new coke ovens. Nonetheless, we believe that recommendation 15 is a useful reminder to states of the importance of considering BACT for new or modified coke oven sources.

7. Comment: We support Recommendation 30 that urges states to contribute BACT data to national RACT/BACT/LAER Clearinghouse to make it an effective resource for mercury control information.

Response: We appreciate the support for this recommendation.

8. Comment: Recommendation 26, which is cross-referenced in Recommendation 15, suggests that states consider making legal changes if they do not have BACT authority. However, BACT would be required by federal authorities whether or not states have BACT authority, and there are no BACT provisions that are linked to a threshold of 10 pounds of mercury as stated in Recommendation 26.

Response: The federal Prevention of Significant Deterioration (PSD) program does create BACT requirements. However, these requirements apply only to criteria air pollutants and not to mercury or other hazardous air pollutants. On the other hand state permitting programs can require BACT for mercury and other pollutants, and can set thresholds as they see fit. Recommendations 15 and 26 refer to these state permitting authorities, not to the federal PSD program.

9. Comment: With respect to Recommendation 28, federal Toxic Release Inventory (TRI) reporting requirements are already in place for toxic pollutants, including mercury, and are based on potency, persistence, and bioaccumulative potential. It is inappropriate for states to superimpose additional reporting requirements for mercury or any other TRI-listed substance.

Response: It is unclear why it would be inappropriate for states to require reporting on mercury emissions. While TRI requirements do apply to many sources, an additional state requirement would provide data at a finer resolution, and offer greater confidence in the accuracy of the emissions data. A state requirement would also cover facilities that are sources of mercury emissions, such as incinerators, but do not report under TRI. TRI data is reported only at the level of the entire facility, and not at the process level. Some states require that activity and emissions data be reported at the level of individual processes, providing a more detailed look at the estimation of pollutants than is allowed

by the TRI. Furthermore, facilities which report to the TRI are not required to disclose the detailed information on how they calculated the emission estimates.

State-specific reporting requires facilities to indicate how the emission estimate for each pollutant and process was created and provide supporting documentation. This disclosure provides a high level of certainty in the accuracy of the reported emissions, particularly where the calculation was based on data particular to that individual facility rather than generic emission factors.

10. Comment: Recommendation 29, the adoption of policies to require multipathway risk assessments in connection with construction permits, would impose unreasonable delays and have serious economic consequences for projects that provide economic development and create needed jobs in the Great Lakes region. If facilities meet regulatory limits established for sources with mercury emissions, compliance with those established limits should be considered prima facie evidence that risks have been addressed. Residual risks must be evaluated as a follow-up to MACT rules under terms of the Clean Air Act, and that is the proper forum for considering risks that may remain to be addressed, not individual state approaches.

The Great Lakes Mercury Emission Reduction Strategy recommends that “States should consider adopting policies that would allow multipathway risk assessments to be conducted for as part of the New Source Review process.” The recommendation is not that states **require** multipathway risk assessments, but that states **give consideration to** when a multipathway risk assessment for mercury would aid in standards setting or other measures. In many cases there are not regulatory limits for mercury that have been established. Several of the sources that are permitted within the Great Lakes Basin do not have a corresponding MACT rule that would at some point trigger a residual risk assessment. It is clearly established that while mercury emission concentrations typically do not exceed any health based guideline for inhalation exposure, mercury can be a concern via the ingestion route from fish consumption, and the primary path by which mercury enters aquatic ecosystems is through atmospheric deposition. Therefore, compliance with a MACT standard (if one even exists and applies to a source), or, acceptably low air concentrations precluding inhalation risks, are not prima facie evidence that risks have been addressed. Both the states of Minnesota and Michigan have used a multipathway risk assessment screening tool that would not impose unreasonable delays or serious economic consequences.

Council of Great Lakes Industries (comments “fully supported” by AISI and ACCCI)

11. Comment: In previous comments, CGLI expressed concern regarding the nature of and authorities under which the Strategy was being pursued. The November 26, 2008 response to comments letter received by CGLI from Debra Jackson of the Great Lakes Regional Pollution Prevention Roundtable informed us that “EPA and the Executive Committee of the Great Lakes Regional Collaboration do not consider the Great lakes Mercury Emissions Reduction Strategy to be an EPA Document.”

However, Section 1.1 of the latest draft states that “[t]his Mercury Emission Reduction Strategy was developed at the direction of the Great Lakes Regional Collaboration (GLRC). The GLRC was convened by the federal agencies, Great Lakes governors, Great Lakes mayors, Great Lakes tribes, and members of the Great Lakes States Congressional Delegation.” These differing descriptions continue to concern us and we are left wondering just what the Strategy is, and whether or not there is sufficient legal authority for it to move forward. We note that the Section 1.1 of the Strategy is titled “Origins and Scope of this **Report**” (emphasis added). Perhaps this description suggests what this document should be considered: a “report” on the subject of mercury emissions controls utilized in the region. The GLRC Executive Committee should consider re-positioning the document as a review or report on mercury emissions topics in order to avoid conflicts over program authority.

Response: The Strategy is not an EPA document; it was developed at the direction of an organization of which EPA is only one member. We will remove the use of the term “Report” and use the term “Strategy” consistently. The term “Strategy” is more appropriate because the document provides recommendations meant to help achieve the goal of mercury emissions reduction, and is not only a report on mercury emissions topics.

12. Comment: The release of the document should have been held up so that key findings or policy implications from the conference [a November 17-18, 2009 Mercury Science and Policy Conference in Chicago] could be incorporated. CGLI requests that the Management Team revisit the structure and purpose of the document and make a special effort use of information from the conference in any version that goes forward.

Response: We will attempt to reflect significant new findings from the conference into the Strategy.

13. Comment: Some points of significance that we recorded during the conference include:  
The general trend regarding atmospheric mercury levels was consistently shown to be downward.

Response: Conference presentations did note a decline in mercury concentration in wet deposition in the Great Lakes and Northeast. We will revise the Strategy to make sure this point is incorporated.

14. Comment: Also recorded at the conference: that the historic large sources of mercury to the atmosphere were incinerators. These had considerable local impact. They no longer exist, or have now been controlled.

Response: The Strategy does reflect this point. Section 3.2 discusses the reduction in the percentage of U.S. mercury deposition attributed to U.S. sources between the EPA’s 1997

Mercury Report to Congress and the EPA's 2005 CMAQ modeling. It states that "the downward revision in the estimate of the impact of U.S. sources on mercury deposition results in part from decreases in U.S. emissions, particularly the dramatic reduction in emissions of oxidized mercury from incinerators." This section also states:

"Locations that are close to mercury sources, particularly to sources of reactive gaseous mercury (or oxidized mercury), which tends to deposit close to the source, are more likely to have high levels of mercury deposition. Waste incinerators were the largest sources of reactive gaseous mercury emissions in 1990; these emissions have subsequently been well controlled. Compliance with recently promulgated and forthcoming mercury rules is expected to reduce future U.S. deposition caused by U.S. sources, particularly in areas of highest deposition."

15. Comment: Also recorded at the conference: that the latest modeling results show that little, if any, reduction in fish tissue mercury levels are predicted to result from significant reduction, or even elimination, of remaining local sources. It will take a substantial reduction in long range transport contributions to provide significant fish tissue mercury level reductions.

Response: We believe that reductions in mercury deposition resulting from controls on coal-fired power plants would have a meaningful impact on mercury levels in fish tissue. We are not aware of any presentations at the Conference that disputed this view. We believe the information presented at the Conference supports the view that controls already placed on oxidized mercury emissions from waste incinerators have led to significant reductions in fish tissue mercury levels in areas near to those sources. Published information reviewed for the Strategy and information presented at the Conference, also supports the view that reductions could be seen in areas near power plants. We agree that it is uncertain whether additional reductions in smaller sources and sources that emit primarily elemental mercury will have a large impact on mercury concentrations in fish tissue, and we believe that the Strategy reflects this perspective. For instance, section 3.6.2 describes how emissions controls on power plants required by the Clean Air Interstate Rule (CAIR) are expected to reduce most of the oxidized mercury emissions from power plants, resulting in significant reductions in mercury deposition. It further describes how additional mercury reductions from power plants, beyond CAIR, which are expected to impact primarily elemental mercury emissions, would have a relatively small impact on local/regional mercury deposition. The Strategy also states, in section 3.7:

While reducing emissions of elemental mercury in the Great Lakes states is expected to have a relatively small impact on mercury deposition within the Great Lakes states themselves, it will also have an impact on reducing mercury deposition to the oceans and to other places where mercury contamination is driven primarily by emissions from global sources rather than nearby sources. While these global deposition reductions would be small, they would be spread out over a broad area and would benefit many people who consume mercury-contaminated seafood.

16. Comment: Also recorded at the conference: The importance of the form of mercury relative to the impact it has in the environment was highlighted by many researchers.

Oxidized mercury is of primary concern. The focus should not be placed on total mercury releases.

Response: Conference speakers did in fact make the point that oxidized mercury releases are the primary cause of mercury deposition near the source of release. However, other conference speakers pointed out that from the perspective of reducing global mercury deposition, it is equally important to reduce elemental mercury. If we were to control mercury sources only based on their local impact, no one would have an incentive to reduce sources whose primary impact is on global deposition and the mercury problem would remain unsolved.

17. Comment: Also recorded at the conference: Our understanding of the health implications of mercury exposure for both humans and the ecosystem is increasing substantially. We must do a much better job of correctly communicating risks to the populations. However, this said, there is no need to overstate the risks. This must be carefully avoided.

Response: We agree.

18. Comment: Also recorded at the conference: While mercury is a factor in the Great Lakes Region's fish consumption advisory problem, other contaminants are the predominant controlling factor at most locations. For example, in Ontario – for the general population – mercury was found to be responsible for between just 1 and 17 percent of advisories. For most areas, PCBs or other substances are the basis for which advisories will remain in place, even if mercury could be completely eliminated from the system.

Response: We agree that there are other pollutants that are responsible for fish consumption advisories. In the United States, mercury is the leading cause of advisories.

19. Comment: Also recorded at the conference: Model results are useful for suggesting policy needs, and the models continue to get better. But, comparisons of these predictions with actual test data are extremely important and must be utilized for good decision making. For example, measurements have shown that emissions declined by 50 percent between 1996 and 2008. At the same time, measured deposition rates have declined by only 10 percent. The models have typically shown higher rates of decline in deposition.

Response: We have noted the uncertainties in modeling atmospheric deposition in the Strategy, for example in section 3.2.

20. Comment: Also recorded at the conference: Reductions of contaminants in environmental media significantly lag reductions in emissions. As a result of emission reductions already made additional reductions in fish and wildlife levels are predicted to follow. This encouraging news must be highlighted.



Response: Section 3.1 of the Strategy notes that re-emissions of previously deposited mercury means that there is a lag between reductions achieved through emissions controls and reductions in the global pool of mercury. We will add that reductions in mercury concentrations of fish and wildlife are also predicted to lag behind reductions in emissions and deposition.

21. Comment: Also recorded at the conference: The nature of the ecosystem (the chemical, biological, physical characteristics) appears to be the controlling factor regarding rate of mercury methylation in the environment.

Response: We agree. The Strategy states: “A number of factors affect the levels of mercury in fish, other than the mercury concentrations in the water. Water chemistry, sulfate deposition, and bacterial activity powerfully influence the amount of mercury that methylates (and demethylates) in a body of water; the trophic structure of the food web, ecological factors, and fishing practices influence the degree to which methylmercury will bioaccumulate.”

To stress these points, we will revise it to read:

“A number of factors affect the levels of mercury in fish, other than the mercury concentrations in the water. The rate of mercury methylation and bioaccumulation varies greatly from place to place, driven primarily by the chemical, biological and physical characteristics of the ecosystem. Water chemistry, sulfate deposition, bacterial activity and fluctuations in water levels powerfully influence the amount of mercury that methylates (and demethylates) in a body of water; the trophic structure of the food web, ecological factors, and fishing practices influence the degree to which methylmercury will bioaccumulate.”

22. Comment: Also recorded at the conference: Given the current advanced state of mercury science, a review of the research agenda needs to be made to focus our attention on the factors most likely to lead to additional progress on mercury issues. Improved inventories, improved understanding of the role of “new” atmospheric mercury oxidizers (halogens) compared to traditional ones (ozone, hydrogen oxide, etc.), indication that dry mercury deposition is a larger portion of total mercury deposition (wet and dry) than previously thought, emerging evidence of the reduction of divalent mercury to its elemental form in coal fired power plant plumes are all topics for which research priority was suggested.

Response: We agree that more research on these topics was suggested at the Conference, but the Strategy team has not undertaken a comprehensive review of mercury research needs, and therefore the Strategy does not make recommendations about this topic.

23. Comment: In CGLI’s comments regarding the November 26, 2008 draft of the Great Lakes Mercury Emission Reduction Strategy highlighted concerns regarding conclusions based on the 2007 NOAA modeling work (Cohen, 2007). This latest version of the draft continues to cite conclusions regarding the significance of local sources, based largely on this reference. These conclusions are at odds with those

drawn by other researchers. Of particular concern are the conclusions reached at the bottom of page 22 of the latest version of the Strategy document that read:

- *“The closer a mercury emissions source of a given size and emissions profile is to the Great Lakes, the more deposition it contributes.”*
- *“Most of the individual emissions sources that contribute most mercury deposition to the Great Lakes are within the Great Lakes states.”*

CGLI is particularly concerned that the Strategy Management Team has chosen not to recognize the work of other researchers who have provided alternative conclusions.

Response: We agree that there are some differences between Cohen’s work and the work of researchers discussed in the Strategy. However, we do not believe that the work of other researchers contradicts the conclusion that *“The closer a mercury emissions source of a given size and emissions profile is to the Great Lakes, the more deposition it contributes”* or that *“Most of the individual emissions sources that contribute most mercury deposition to the Great Lakes are within the Great Lakes states.”* Note that we have not concluded that sources within the Great Lakes states are more important than sources outside the Great Lakes, but rather that proximity of a source matters, other factors being equal, and that most of the large individual source contributors to mercury deposition in the Great Lakes are located within the Great Lakes states. We do not believe that these statements are controversial within the scientific community.

24. Comment: Section 3.3 Mercury Deposition to the Great Lakes Region appears to rely heavily upon modeling work done by the National Oceanic and Atmospheric Administration (NOAA) in 2007 (Cohen, 2007). . . . There are deficiencies in the modeling approach used in the NOAA work which minimize its ability to accurately simulate real-world conditions. According to an analysis of the modeling by the Electric Power Research Institute (EPRI) the NOAA Report’s “conclusions are based on modeling methods that are sensitive to the selection of the particular trajectories used, the limitations in data on contributing mercury source strength, and reliance on uncertain inventory.” The EPRI comments (available at: <http://www.box.net/shared/4ksimrfoam>) note three major problems:

- The modeling ignores the contribution of global mercury sources to U.S. deposition.
- An inconsistent set of mercury chemical reactions is included in the modeling.
- The model has never been tested against the full set of observational data.

Response: We recognize that no mercury modeling effort is perfect and that scientific work is open to criticism. We present Cohen’s work, not as the single definitive answer about mercury modeling, but as one of many efforts that contribute to our understanding of the sources of mercury deposition to the Great Lakes. While it is true that the modeling does not examine the contribution of global mercury sources to U.S. deposition (and does not claim to), it is not used in the Strategy to evaluate the relative contributions of U.S. versus global sources. Rather, it is used to help evaluate which U.S.

anthropogenic sources are the primary contributors of mercury deposition to the Great Lakes.

25. Comment: Work by Gbor, et al. . . . notes the importance of including natural mercury emissions (*i.e.*, natural sources including vegetation, soil and water). This work simulated the behavior of mercury in a domain covering most of North America using a natural mercury emission model coupled with EPA's CMAQ-Hg model. The model was used to estimate the emission of mercury from natural sources, the concentration of mercury in the atmosphere and the deposition of mercury to the continent of North America and the Great Lakes. Among the study's conclusions (available at: <http://www.box.net/shared/4ksimrfoam>):
- Good agreement was found between the modeled results and measurements at three Ontario sites for ambient mercury concentrations, and at 72 mercury deposition network sites in the domain for wet deposition. The correlation coefficient between the simulated and the measured values of the daily average TGM at three monitoring sites varied between 0.48 and 0.64. When natural emissions were omitted, the correlation coefficients dropped to between 0.15 and 0.40.

This conclusion highlights the importance of considering background mercury deposition levels when any assessment of source significance is attempted.

Response: We agree that background mercury levels are important and that the fact that these are not included in Cohen's study is important to note. We will state this in the Strategy.

26. Comment: Modeling work by Vijayaraghavan, et al. presented at the 2005 Great Lakes Research Conference (available at: <http://www.box.net/shared/4ksimrfoam>) found no more than a three percent change in mercury deposition over the Great Lakes if all coal-fired power plants' emissions were zeroed-out compared to base case emissions. The study concluded that "Michigan coal-fired power plants are estimated to contribute between one to three percent to Great Lakes deposition and about two and one-half percent to deposition over Michigan." This work was based on the Seigneur et al. (2004) modeling highlighted in the Mercury Emissions Strategy draft documentation.

Response: Vijayaraghavan, et al. found no more than a three percent change in mercury deposition over the Great Lakes if all the emissions of coal-fired power plant *in Michigan* were zeroed out. We will include this finding in the Strategy. However, controls on all power plants in the Great Lakes region, or across the United States, would be expected to reduce mercury deposition to the Great Lakes region by well more than three percent. Section 3.6.2 describes the changes to mercury deposition in the Great Lakes region that would result from controls on power plant emissions nationwide, as modeled by USEPA using CMAQ.

27. Comment: These three examples [in the previous three comments] provide a consistent and important message for the Great Lakes Regional Collaboration project, namely:

- The extant science incorporated in the “one atmosphere” models is robust and model outputs are consistent with actual measurement data
- The “one atmosphere” models, such as CMAQ, which include global background and natural emission estimates inputs, are the most realistic assessment methodologies available with which, the likely benefits of residual emission reductions proposed by the Great Lakes Regional Collaboration can be estimated.
- Based on U.S. EPA and EPRI modeling of large industrial sources of mercury (e.g., coal-fueled power plants ), the models would predict very meager reductions in mercury deposition to the Great Lakes from proposed phase-out activities involving residual sources of mercury. This likely outcome needs to be shared with the Great Lakes community to minimize unrealistic expectations from residual emission reduction actions.

Response: The comment about the consistency of models with measured data seems inconsistent with CGLI’s earlier comment about model overestimation of changes in mercury deposition resulting from emissions reductions. Section 3.3 notes that EPA considers CMAQ to be the best model. We do not agree that models predict meager reductions in mercury deposition from control of power plant mercury emissions. We do agree that according to the modeling, additional controls on sources within the Great Lakes states, beyond those that have been achieved or are expected to be achieved by federal regulation, would have only a small impact on total deposition to the Great Lakes. We believe that the Strategy reflects this, but we will state it more clearly, in section 3.6.2.

28. Comment: It is important to point out that the contributions to mercury deposition shown in Figure CD come from estimates made by Cohen using 1999-2001 emissions data. Significant reductions have been made over the last decade, and additional reductions will come from new controls currently planned or anticipated.

Response: We agree, and the Strategy will be revised to reflect this point.

29. Comment: Although the draft strategy discusses source regulations, not all activities currently underway to further regulate sources – or the results that these regulatory requirements will have on regional sources – have been recognized. For example, EPA is currently on track to promulgate final rules to regulate mercury and other hazardous air pollutant (HAP) emissions from coal- and oil-based power plants by November 16, 2011. In addition, 20 states, including most states in the Great Lakes region (Illinois, Michigan, Minnesota, New York, and Wisconsin) have strict state rules in place to regulate mercury emissions from coal-based power plants.

The Strategy also applies to other sectors such as steel making where additional regulatory controls are either being implemented or are being finalized. These will

also significantly reduce the region's mercury emissions inventory. Much of this regulatory activity has been advanced under federal authorities where rulemaking processes have established technology appropriate and cost effective controls. The Strategy should not second guess the outcome of these processes nor advocate or require additional or different measures.

Response: The Strategy does not second guess federal rulemaking, but does identify areas of potential state action where:

- voluntary pollution prevention can enhance the reductions achieved by federal rules;
- federal action may be delayed;
- research to develop cost-effective controls is needed;
- federal regulations do not apply because the source category is unregulated or sources are below thresholds for federal regulation.

30. Comment: The Strategy document does not include a cost-benefit analysis. When development of the Strategy was proposed by the Great Lakes Regional Collaboration, the charge articulated within the Collaboration's resulting Strategy was to:

*“produce institutionalized activities to sustain mercury emissions reduction from new and existing sources whose mercury emissions have not been regulated, and from sources where regulations have been implemented but additional reductions are technically feasible and economically reasonable (emphasis added).”*

The requirement that Strategy provisions be considered “economically reasonable” does not appear in the latest draft. i.e. in Section 1.1 (Executive Summary - Origins and Scope of this Report) or section 2.1 (Goal and Background – Origins and Scope of the Report) where the authorization and history of Strategy development is discussed. In fact, in the entire document, the only place where economical considerations appear to have been mentioned is in the section relating to chlor-alkali facilities in Section 5.3.1 on page 47.

In addition to the need to reflect the initial charge under which the Strategy was to be developed, the severe economic situation that the Great Lakes Region continues to face clearly points to the need for consideration of economic factors in Strategy recommendations. To justify recommending restrictions on struggling Great Lakes industries that are more stringent than those that these industries face nationally, sufficient need and realization of significant benefits must be demonstrated. The Strategy document fails to do either.

. . . Please let us know how we can help the Team evaluate the need for, and benefit that can come from, any additional mercury emissions controls. The threat that such requirements can adversely affect the region's industries is real and of great concern.

Response: The terms “technically feasible” and “economically reasonable” emission controls were not included in the Strategy because these phrases are terms of art used in the development of emissions control standards, and we do not want to imply that the Strategy is a substitute for the regulatory processes used to identify technically feasible and economically reasonable controls. Rather, the Strategy identifies actions that states can take to promote voluntary reductions or develop control requirements that meet state conditions for technical feasibility and economic reasonableness. We attempt to clarify these points in section 2.1.

We appreciate CGLI’s offer of assistance, and will take advantage of this in the implementation of the Strategy

Intertribal Council of Michigan Environmental Services Department (ESD)

31. Comment: The ESD would support even stronger recommendations for State action related to coal-fired power plants, than those stated in the Strategy. Maintaining the current path of State and/or Federal mercury regulation is in many cases not enough to protect the Great Lakes ecosystems from increasing mercury contamination. Though the State of Michigan has promulgated a new and significant mercury rule, the Michigan Department of Environmental Quality has also recently issued a Permit to Install for a new 930 MW coal-fired power plant in Michigan. The State of Michigan has two other pending Permit to Install’s for coal-fired power plants awaiting decisions. The continued permitting of coal-fired power plants by the State of Michigan, despite the known detriments to the Great Lakes ecosystem from plant operations and the availability of alternative energy options, is a great source of concern for Inter-Tribal Council of Michigan ESD.

Response: Given that USEPA is committed to developing a MACT standard for coal-fired power plants, some of the Great Lakes states have decided not to pursue separate state rulemaking for this sector, unless EPA fails to propose a standard by 2013. Therefore, not all of the Great Lake states are willing to commit to initiating rulemaking now.

The Michigan Department of Natural Resources & Environmental Quality (MDNRE) approved an air permit for a new coal-fired power plant in the state of Michigan with the provision that the company would retire 958 MW of older, less efficient plants. When these units are retired and the new plant is in operation, it will result in a state-wide mercury emission reduction of over 300 pounds/year.

32. Comment: Current source permitting practices, even in upcoming mercury rules, do not often account for Tribal rates of fish consumption, which may be four times as much as the EPA documented recreational sport-fishing rate of consumption (15 grams per day, compared with 60 grams per day as reported in the Ojibwa Health Study by Dellinger). The ESD recommends that higher rates of fish consumption are considered in risk assessments and in the recommended federal establishment of a major source category threshold for mercury.

Response: The level of fish consumption used in risk assessments is an issue beyond the scope of the Strategy. We will revise Recommendation 27 to reflect the importance of the higher rates of fish consumption by some subpopulations, so that it reads:

The Great Lakes states recommend that EPA use the existing authority in Section 112(a) of the Clean Air Act to establish a major source category threshold for mercury that is a lesser quantity, appropriately reflecting the quantities in which mercury is actually released, the exposures of subpopulations that consume significant amounts of fish, and mercury's potency, persistence and potential for bioaccumulation.

33. Comment: The ESD suggests the inclusion of Tribes in Recommendation 34, the workgroup appointment. The ESD will watch for the State of Michigan's identification of implementation priorities and the organizations responsible for achieving them.

Response: Recommendation 34 will be revised to include Tribes in the implementation workgroup.

#### New England Interstate Water Pollution Control Commission (NEIWPCC)

34. Comment: While we support the vast majority of the Great Lakes states' recommendations for mercury emission reduction as they are written in the Strategy, we suggest a modification to Recommendation 4 so that it reads:

Recommendation 4: States that have not yet developed recommendations to limit mercury emissions from coal-fired power plants should begin initiating such steps now, and based on current regulations being implemented or already developed in the Great Lakes states, as well as in other regions, the states should establish regulations to achieve at least 90 percent removal of mercury as soon as practicable.

Response: Given that USEPA is committed to developing a MACT standard for coal-fired power plants, some of the Great Lakes states have decided not to pursue separate state rulemaking for this sector, unless EPA fails to propose a standard by 2013. Therefore, not all of the Great Lake states are willing to commit to initiating rulemaking now.

35. Comment: With the exception of Recommendation 4, we are in support of all other recommendations, and urge that all of the Great Lakes states implement these as soon as practical.

Response: We appreciate the support.

Larry Fink, Waterwise Consulting

36. Comment: Mercury emissions reduction is not an end in itself but a means to an end. That end is the reduction of methylmercury contamination of the Great Lakes aquatic ecosystem. . . . To that end, the strategy needs to be reformulated as a Great Lakes Methylmercury Contamination Reduction Strategy based on attaining and maintaining the uniform methylmercury Water Quality Standards adopted by the Great Lakes states to protect human health, wildlife reproduction, and the use of the sport and commercial fisheries. The Great Lakes Methylmercury Contamination Reduction Strategy needs to be reformulated based on a Total maximum Daily Load (TMDL) promulgated pursuant to Section 303(d)(1)C of the Clean Water Act for Lake Michigan and the equivalent for the other Great Lakes shared with Canada.

Response: The TMDL program is responsible for development of mercury TMDLs for Lake Michigan and other water bodies. This Strategy does not attempt to duplicate the work conducted by the TMDL program, but rather to enhance it.

37. Comment: The Draft Great Lakes Mercury Emissions Reduction Strategy relies heavily on air emissions data and transport-transformation-deposition modeling results that have not been validated within a mercury mass balance framework. This is contrary to concepts, principles, and practices of sound science.

Science-based decision-making in the face of uncertainty requires that the sources of uncertainty are identified, their magnitudes quantified, and their environmental consequences evaluated. This has not been done. This is contrary to concepts, principles, and practices of sound environmental restoration decision-making.

The Great Lakes Mercury Emissions Reduction Strategy needs to include an analysis of the sensitivity of the proposed approach to mercury emissions reduction and its anticipated efficacy to the uncertainties introduced by (1) the estimates of the absolute and relative contribution of local, regional, national, continental, and global air emissions sources of the various mercury species to each of the Great Lakes; (2) the estimate of the total mercury mass budget for each of the Great Lakes; and (3) the estimate of the methylmercury mass budget for each of the Great Lakes. This sensitivity analysis should then be used to prioritize staff, physical, and fiscal resources to be allocated to additional mercury species source inventories; emission, deposition, and ecosystem component monitoring; targeted, time-limited research into the transport, deposition, and aquatic and terrestrial ecosystem biogeochemistry and bioaccumulation of mercury species; and targeted, time-limited modeling of same.

The Great Lakes Mercury Emissions Reduction Strategy needs to adopt a quality hierarchy based on confidence in the accuracy, precision, and reliability of the methods and data used to generate (1) the estimates of the absolute and relative contribution of local, regional, and global air emissions sources of the various mercury species; (2) the estimates of the total mercury mass budget for each of the Great Lakes; and (3) the estimates of the methylmercury mass budget for each of the



Great Lakes. To illustrate what is being requested, a proposed quality hierarchy for emissions sources is: long-term, Great Lakes source-specific monitoring using EPA-approved methods and procedures validated by a mercury mass budget > unvalidated > short-term Great Lakes source-specific monitoring using EPA-approved or demonstrably equivalent methods and procedures validated by a mercury mass budget > unvalidated > Great Lakes category-specific validated by a mercury mass budget > unvalidated > national category-specific > modeling estimates validated by a mercury mass budget > unvalidated. Within each quality category, preference should be given to results generated via peer-reviewed study plans, results, and publications for work conducted by EPA > for EPA > for others with EPA peer review > for others without EPA peer review. In this proposed quality hierarchy, the results of studies published by Seigneur et al. should not be given great weight in developing the mercury emissions reduction strategy or evaluating its likely efficacy.

Response: We do not have the resources, under this Strategy, to conduct the type of modeling work that the commenter recommends. We believe, moreover, that the current state of mercury inventories, speciation, and modeling and is not sufficiently well developed to support an approach in which sources are targeted based on contribution to methylmercury levels in the Great Lakes, as opposed to total emissions mass. Moreover, existing legal authorities and bureaucratic capacities do not make such targeting a promising approach. We believe that the Great Lakes will benefit most from an approach that attempts to reduce total mercury emissions as much as possible, focusing on sources of oxidized mercury where these can be identified. We believe that achievement of significant emissions reductions, even from sources that do not have a large impact on the Great Lakes, will contribute to the solution of the global mercury problem and help set an example of mercury reduction that may inspire action elsewhere.

38. Comment: What are the environmental justice ramifications of the Strategy?

Response: Reduction of mercury contamination will have benefits for consumers across racial and income groups. Groups such as subsistence fishers, some minority communities, and tribes may benefit the most as they tend to eat significant amounts of locally-caught fish. Section 2.2 will be revised to reflect this.

39. Comment: What is the target recovery period for each of the Great Lakes? Without a target recovery period for each of the Great Lakes, the adequacy of proposed federal and state schedules for limiting mercury emissions from any source category within or upwind of the Great Lakes Basin cannot be meaningfully evaluated.

Response: We are not aware of studies establishing the lag time between reductions of mercury inputs and recovery for the Great Lakes. We have added a brief discussion of the general issue of recovery periods to the Strategy.

40. Comment: What is the anticipated mercury load reduction to each Great Lake from direct deposition and stormwater runoff transport of indirect deposition associated

with the implementation of BACT and MACT for each source category listed in this section?

Response: We have not calculated load reductions. That is not the purpose of this Strategy.

41. Comment: Phrases such as should consider an action or are encouraged to adopt an action to eliminate or substantially reduce a mercury source suggest that the Strategy does not take its purpose seriously.

Response: We take the purpose of the Strategy very seriously. However, not all of the Great Lakes states can commit to implementation of each of the Strategies.

42. Comment: “While addressing mercury emissions, mercury product use and disposal of mercury-containing products within the Great Lakes Basin is important, these actions alone will not be sufficient to protect the Great Lakes ecosystem from mercury and allow for the removal of fish consumption advisories throughout the Great Lakes and in nearby inland lakes. Most of the mercury inputs to the Great Lakes come from overseas emissions of mercury combined with naturally-occurring mercury. Therefore, international action to reduce mercury emissions is needed.”

Change “important” to “critical”.

Response: We will make this change.

43. Comment: The conclusion that “... these actions alone will not be sufficient to ... allow for the removal of fish consumption advisories...” presupposes a known or inferred quantitative relationship between the mercury species load from local, regional, national, and global sources and the steady-state methylmercury concentrations in water, sediment, and aquatic and terrestrial biota. What is that quantitative relationship? Where are the data, analyses, models, modeling results and EPA peer-reviewed documentation to support this conclusion?

Response: We include an explanation of this issue in a new footnote 6. While the impact of mercury emissions from the Great Lakes states on the Great Lakes has not been modeled, modeling done on a nation-wide basis and an individual state basis shows that mercury emissions reductions beyond the Great Lakes states are necessary for meeting water quality standards in the Great Lakes. EPA’s Mercury Maps project found that achievement of water quality standards for Lake Superior would require roughly a 20 percent reduction in mercury deposition, and achievement of water quality standards in some watersheds within the Great Lakes basin would require 75 percent reductions in mercury deposition. EPA modeling of 2001 emissions found that nationwide, only 16 percent of mercury deposition was caused by sources within the United States.<sup>1</sup> While

---

<sup>1</sup> See U.S. EPA. **Mercury Maps: A Quantitative Spatial Link Between Air Deposition and Fish Tissue.** EPA-823-R-01-009 (September 2001). U.S. EPA 2005. Mercury Deposition in the United States, Access: <http://www.epa.gov/mercuryrule/pdfs/slide2rev1.pdf>.

the share of mercury deposition attributable to U.S. sources varies greatly from place to place and the average for the Great Lakes basin is higher than this national average, some of the areas within the Great Lakes basin identified by the Mercury Maps project as requiring large reductions in deposition are also places that have a lower than average share of mercury deposition attributable to U.S. sources. For instance, compare Figure 1 in the Mercury Maps report to Figure A in the Strategy. It is not possible through controls on sources in the Great Lakes States alone to achieve reductions of 20 to 75 percent in deposition in areas where 16 percent or less of deposition can be attributed to sources in the entire United States.

In addition, Minnesota's Statewide Mercury TMDL provides analysis that shows that emissions reductions in Minnesota will not be sufficient to achieve water quality standards in Minnesota. The Minnesota Statewide TMDL found that a 65 percent reduction in mercury deposition to Northeast Minnesota would be necessary in order to achieve water quality standards for mercury. Given that natural mercury sources account for an estimated 30 percent of mercury deposition in Northeast Minnesota, MPCA estimates that anthropogenic emissions would need to be reduced by 93% from 1990 levels, or 76 percent from 2005 levels. Since MPCA estimates that only 10 percent of mercury deposition in Minnesota results from within-state mercury emissions, even the complete elimination of these emissions in Minnesota would not lead to achievement of water quality standards. While elimination of mercury emissions from all of the Great Lakes states would have a bigger impact, it still would not be sufficient, based on extrapolations from modeling of the impact of North American emissions on the Great Lakes Region. For instance, Figure B of the Strategy shows EPA's CMAQ modeling, which indicates that natural emissions and anthropogenic releases from outside of North America account for more than 87.5 percent of mercury deposition in most of Northeast Minnesota. The smallest share for non-North American sources was 37.5 percent in a single modeled 36 km grid cell. Given these estimates of contributions coming from outside of North America, it would be difficult to achieve the reduction required to meet water quality standards, even through the elimination of all North American emissions.

44. Comment: The accuracy of this conclusion depends on the accuracy, precision, and reliability of limited local, regional, and continental modeling of sources, transport, and deposition. Some of the limited modeling supporting this conclusion has been sponsored by the potentially regulated community and should not be used to develop or implement the mercury emissions reduction strategy in general or reduction targets and schedules in particular unless verified by others without a potential bias and validated within a mass balance framework.

Response: We believe that good quality studies support our conclusion that reducing mercury emissions within the Great Lakes states will not be sufficient to resolve mercury contamination issues within the Great Lakes basin.

45. Comment: If this conclusion is true, how much local, regional, continental, and global mercury source reduction will be required to "allow for the removal of fish consumption advisories throughout the Great Lakes and in nearby inland lakes"?

Response: This is beyond the scope of the Strategy.

46. Comment: I do not disagree that international action to reduce mercury emissions is needed, but U.S. leverage in negotiating an international mercury reduction treaty is greatly strengthened if the U.S. has taken the lead in phasing out mercury use and reducing mercury emission according to a feasible but aggressive schedule. The U.S. made a disproportionately large contributed to the legacy anthropogenic mercury in water and soil in the last century. The U.S. has a disproportional obligation to contribute to the reduction of new anthropogenic mercury in the new century.

Response: We agree with this perspective, as shown in section 3.7.

47. Comment: Section 2.1 needs to be rewritten to better explain the relationship between the inorganic mercury load and the transformation and build-up of methylmercury in sediment, water, and aquatic and terrestrial biota to unacceptable levels on the one hand and mercury load reduction and the clearance of methylmercury and recovery of the Great Lakes and terrestrial ecosystems to acceptable levels on the other hand.

Response: We will add material to section 2.2 on this topic.

Judith Campbell

48. Comment: Please don't delay any longer, the science is there. Now we need to do the right thing and require elimination of by-product mercury sources, and mandatory recycling for all other Hg that has no other currently known non-toxic substitutes.

Response: We will attempt to implement the Strategy as quickly as we are able.

Jerry Sgro

49. Comment: Monitoring of aquatic biota such as algae and fish to determine the success of the Strategy should be mentioned.

Response: We agree that monitoring of biota is important. However, the focus of the Strategy is on actions to reduce emissions. Coordination and prioritization of monitoring efforts is occurring in other fora, such as the Great Lakes Mercury Project.