

I. PETITIONERS

Petitioner Keith Reopelle joins in this petition individually as a long-time Wisconsin angler with young children in his family and in his capacity as Program Director of Wisconsin's Environmental Decade (WED). WED is a nonprofit public interest organization concerned with the protection and improvement of Wisconsin's lakes, rivers, wildlife and public health. WED has approximately 25,000 members statewide, many of which have a vested interest in clean lakes and rivers and their ability to utilize fish and wildlife resources as a source of both enjoyment and food for their families.

Petitioner Chuck Rolfsmeyer joins this petition as the President of the Wisconsin State B.A.S.S. Federation. The B.A.S.S. Federation believes that it is the responsibility of the state and state natural resources agencies to uphold the public trust doctrine as it applies to lakes and rivers of the state. The B.A.S.S. Federation also believes the public trust doctrine does little good if the state agencies are not able to take the necessary actions needed to keep waters clean and fish safe to eat. It further maintains that the mercury emission rules requested in this petition are critical to make game fish safe to eat and to avoid the adverse health impacts of this highly toxic metal which threatens anglers and their families.

Petitioner Bob Elliker joins this petition as President of the Wisconsin Division of the Izaak Walton League of America, representing 1,000 members in Wisconsin. The pledge of the Izaak Walton League, a national conservation organization, many of whose members are hunters and fishers begins "To Strive for the purity of water, the clarity of air, and the wise stewardship of the land and its resources...". This pledge helps bring meaning to the Wisconsin Division of the Izaak Walton League's strong desire that the DNR rulemaking begin quickly to create caps and reductions of mercury emissions. This will be the star! of reducing the health hazard of mercury concentrations present today in the environment.

Petitioner Ted Lind joins in this petition individually as a life-long angler and as President of the Wisconsin Council of Sport Fishing Organizations' (WCSFO). The WCSFO serves as a voice for its more than 50 sport fishing organization members, behalf of those members, WCSFO strongly supports the requested rules recognizing that making sport fish safe for children and future generations is critical to ensuring a bright future for sport fishing in Wisconsin.

Petitioner William Kordus joins in this petition individually as a long-time angler with two properties on and near two separate water-bodies, both of which are listed on the DNR's fish consumption advisory. He also joins this petition as the representative for the Twin City Rod and Gun Club of Neenah/Menasha, whose membership of 3,600 consists of anglers and hunters concerned with the negative impacts mercury has on human health and the health of fish and wildlife.

Petitioners John and Linda Badagliacco join in this petition as owners of the Blueberry Hill Resort in Couderay, Wisconsin. Their livelihood depends upon tourism in Northern Wisconsin, much of which is based upon fishing and natural resources. They are concerned that the increasing number of lakes listed on the fish consumption advisory for mercury will have an adverse impact on their business.

Petitioner Gary Engberg joins in this petition as a professional angler, fishing guide and owner of Gary Engberg Outdoors, an outdoor production company. He is one of many licensed fishing guides whose economic livelihood relies on a healthy fish population. Gary guides on many waters with fish consumption advisories for mercury including lakes Monona, Waubesa, the Wisconsin River and its flowages, and knows firsthand that reducing mercury emissions is critical to the future of Wisconsin's sport fishing economy.

Petitioner Russ Ruland joins in this petition individually as a lifelong Wisconsin fisherman who is concerned about the danger of eating fish from Wisconsin waters. As President, and on behalf, of the 150 member Muskellunge Club of Wisconsin, he is also concerned, about the effect of mercury contamination on the natural reproductive capacity of our fish and wildlife.

Petitioner Emily Kordus joins in this petition individually as an avid angler who is concerned with the negative health impacts consumption of high mercury fish has on fetuses and children. She is very concerned not only for herself as someone interested in having children in the future, but especially for the overwhelming majority of women who are not aware of the dangers mercury poses to their present and future children.

Petitioner Martha Kilishek joins in this petition individually as an angler who enjoys teaching her two young grandchildren to fish and believes the impact from mercury pollution may prohibit these children from enjoying eating the fish they are learning to catch. She has property on a lake in northern Wisconsin and hopes our "Clean the Rain" campaign will improve Wisconsin waters. She is President of the Wisconsin Wildlife Federation whose broad objectives are to create and encourage an awareness of the need for wise use and proper management of our resources upon which the lives and welfare of all Wisconsinites, wildlife and fisheries depend—the soils, plant life, minerals, air and water. This organization of over 9,000 has an Environmental Committee, which has studied the mercury emissions in depth and strongly supports, this petition.

Petitioner Donna Wilcox joins in this petition individually and also as Secretary of the Last Wilderness Conservation Association, Inc., of Vilas County, Wisconsin, whose mission is "To conserve, enhance, and protect our natural resources through education, communication and the promotion of sound environmental practices." Donna is an avid angler who is concerned with the negative health impacts consumption of high mercury fish has on wildlife and humans alike, especially fetuses and children. She is very concerned not only for herself as someone who has small children, but especially for the overwhelming majority of men, women and children who are not aware of the dangers mercury poses to their present lives and to our future generations to come.

Petitioner Jim Wise joins in this petition as the president of Environmentally Concerned Citizens of Lakeland Area (ECCOLA) located in the North Central lake district of Wisconsin. The 400 member ECCOLA was formed in 1992 as a result of threats to the numerous lakes in Lincoln, Vilas and Oneida Counties. A great many of the lakes on the Wisconsin mercury advisory list are located in these three counties. He is also co-owner of a retail outdoor clothing and equipment store and has worked on many tourism related programs with the local Chamber of Commerce. Mercury pollution is viewed as a serious threat to the health of humans and wildlife, as well as the tourist economy.

Petitioner Ann T. Behrmann, M.D., joins in this petition as a Wisconsin Pediatrician, a mother and on behalf of the Steering Committee of Madison Physicians for Social Responsibility, with recognition that methylmercury is a potent neurotoxin that causes irreparable damage to the developing human nervous system. Ingestion of contaminated freshwater fish by pregnant women or small children can result in brain damage to these vulnerable populations. Wisconsin has the opportunity with this petition to markedly decrease the risk of mercury poisoning for our future generations.

Petitioner Eric Uram joins this petition as a life-long angler and Associate Representative for the Midwest Office of the Sierra Club. The Sierra Club represents over 600,000 members nationally dedicated to protecting the environment for our families, for our future; this includes taking measures to prevent releases of toxic chemicals and elements, including mercury I that threaten the health of the public and the environment. Since no mercury advisory for fish consumption has ever been removed from any Wisconsin waters once listed, he desires that the WI DNR take immediate action to reduce the amount of mercury released into the environment from all sources under their jurisdiction. And further, to achieve virtual elimination of all anthropogenic mercury releases in the Lake Superior airshed by the year 2020 as stated in the goals of the International Joint Commission's Binational Program to protect Lake Superior.

Petitioner Gary Werner joins this petition as the Conservation Chair of the state chapter of the Sierra Club, known as the John Muir Chapter, with over 10,000 active members residing in Wisconsin. A lifelong naturalist and founder of the Sierra Club, John Muir lived in Wisconsin and worked throughout

his life to protect and preserve that which nature had given. Included in those protections were the health and welfare of the land and all its inhabitants. As Conservation Chair, Gary Werner continues to work for this. Mercury pollution threatens humans and all other life with its toxic legacy, which as an element, doesn't break down. Continued emissions of mercury will only increase the environmental burden, increasing threats to all life. He desires that the WI DNR to take all steps in their power to eliminate all mercury releases and help create a non-threatening environment for all life.

Petitioner Brian Burke joins in this petition as a Wisconsin resident and in his capacity as a member of the Wisconsin State Senate. As a state legislator, he is charged with promoting and enacting public policies that protect the health and safety of residents of the 3rd Senate District and the entire state.

Petitioner Representative Dean Kaufert joins this petition as a resident of the state and a supporter of conservation policies in the Neenah-Menasha area and the state as a whole.

Petitioner Spencer Black joins the petition as the state Representative for the 77th Assembly District. Black represents numerous constituents who fish in lakes Monona and Waubesa which are both listed on the DNR's fish consumption advisory. These constituents are limited in their enjoyment of the lakes because of the limits on fish consumption contained in the DNR advisory.

Petitioner Joe Handrick is a lifelong resident of Oneida County and represents Oneida and Vilas counties in the State Assembly. As a representative of the nation's largest concentration of inland lakes, Joe joins in this petition.

II. NATURE OF THE REQUESTED RULES

The petitioners request Wisconsin DNR and the Natural Resources Board to promulgate the following:

1) A rule which creates a comprehensive program in the DNR for addressing mercury in the environment including:

- mercury deposition and monitoring activities --other mercury research
- public information and education outreach in coordination with the Health Dept. -technical assistance for stationary sources of mercury
- cooperative mercury reduction activities with neighboring states and federal government
- activities to reduce mercury emissions from small (purposeful use) sources -activities to address problems associated with long-term storage of mercury -activities to address the effectiveness of this program for reducing mercury in the environment
- activities to minimize the release of mercury into the environment from coal ash and other solid waste streams
- any other component identified by the Department

2) A rule which requires the Department to appoint a mercury control council of up to 12 members, including representatives from environmental and sport fishing organizations, Wisconsin Waters) which currently warns anglers and their families to not eat certain fish from 341 lakes and rivers (approximately one out of every three tested) due to unsafe levels of mercury contamination. This list will continue to grow as the Department continues to test additional lakes. Approximately one out of every three lakes tested ends up on the advisory.

2) The Health Department warns pregnant women not to eat certain large game fish from all Wisconsin lakes that have not been tested.

3) The most common fish species listed on the health advisory is walleye which is also one of the most sought after game fish for eating.

4) Mercury is a neuro-toxin which means that it adversely impacts-the brain and nervous system making small children and pregnant women and their fetuses particularly susceptible to mercury poisoning.

- 5) Mercury stays in the body for a relatively long period of time (half life of 30 to 120 days) so that mercury contaminated fish meals eaten prior to pregnancy can impact the fetus.
- 6) Chronic exposure to mercury contaminated fish prior to or during pregnancy can result in infants and children with lower I.Q.s, reduced attention span, reduced memory capacity, reduced motor skills, and other mental and physical impairments.
- 7) Acute exposure to mercury contaminated fish prior to or during pregnancy can result in infants with severe mental and physical retardation.
- 8) Acute exposure to mercury contaminated fish in Wisconsin has led to at least one case of acute mercury poisoning where the individual, Henry Henk (Hayward), lost 100 pounds of weight, lost the use of his legs, suffered severe dementia (didn't recognize his own wife), and nearly died.
- 9) Fish consumption is the route of human exposure to mercury of greatest concern and there are currently no regulations of mercury emissions which take this route of exposure into account.
- 10) The presence of mercury in combination with other contaminants found in Wisconsin fish, such as PCBs, increases the likelihood of adverse health impacts at lower levels of mercury contamination.
- 11) Levels of mercury found in commercially sold fish in stores or restaurants (e.g. canned ~ are, on average, about half of what they are in fish caught from Wisconsin waters listed on the health advisory. The fish consumption advisory assumes no consumption of no commercially sold fish, underestimating the risk for anyone who does eat fish from the store or a restaurant.
- 12) The Department of Natural Resources sells over 1 million fishing licenses but only publishes 40,000 fish consumption advisories. The vast majority of anglers and their families never see the fish consumption warnings for mercury contamination.
- 13) The U.S. Environmental Protection Agency (EPA), Northeast States for Coordinated Air Use Management (NESCAUM) and other government agencies have identified numerous mercury removal control technologies currently available for electricity generating boilers including coal cleaning, wet scrubbers, dry scrubbers, fabric filters, combined ESP/baghouse and other combinations of existing technologies.
- 14) Studies have linked mercury contamination to impaired reproduction in wildlife particularly loons and other fish-eating species.
- 15) In at least one DNR research project, reduced hatching success and reduced survival of embryos were associated with high mercury concentrations in walleye eggs from two northern Wisconsin lakes.
- 16) Nearly, two million people fish in Wisconsin and spend nearly \$1 billion each year. In 1996, fishing license sales alone totaled \$26 million. More than 30,000 jobs in the state depend on sport fishing; sport fishing in Wisconsin depends on clean lakes, clean rivers and clean fish.
- 17) Certain cultures are at greater risk of adverse health impacts resulting from consumption of mercury contaminated fish due to their tendency to engage in semi-subsistence fishing. Certain Native American tribes, for example, rely heavily on game fish as a food source, as do certain Hmong communities.
- 18) More than 100 organizations have passed resolutions (see attached) supporting a policy to reduce mercury emissions in Wisconsin, including more than 40 sport fishing organizations, numerous lake associations, environmental groups, resort owners, Native American tribes and other groups representing communities of color which are disproportionately impacted by mercury contaminated fish.

16) Until states with the greatest mercury contamination in lakes and fish (e.g. Wisconsin), and therefore extensive fish consumption advisories, take action to reduce their own mercury *emissions*, there is little hope of receiving cooperation from upwind states with few, if any, fish consumption advisories (e.g. Illinois, Missouri, Texas, etc.).

IV. AGENCY AUTHORITY TO ADOPT REQUESTED RULES

The Department of Natural Resources is provided with direct and clear authority to promulgate the rules requested in this petition under 285.11 (9) Wis. Stats., which instructs the Department to "Prepare and adopt minimum standards for the emission of mercury compounds or metallic mercury into the air." The bill which created this law was 1971 Assembly Bill 556, introduced by (then) Representative Tommy G. Thompson and two other legislators. The bill was clearly in response to high levels of mercury in Wisconsin River fish which prompted Governor Warren Knowles to close 40 miles of the Wisconsin River to fishing for two months in 1970.

The law created by this bill, Chapter 272, Laws of 1971, had three components: one restricting mercury discharges to the water, one requiring a materials balance sheet for purposeful use of mercury (addressing disposal), and a third (section 1, 144.422) requiring that the department "prepare and adopt minimum standards for the emission of mercury compounds or metallic mercury into the air." This requirement creates clear and direct authority for the DNR to promulgate the rules requested in this citizens' petition.

The Department did adopt mercury air emission standards in response to the passage of this law. However, the current air toxics standards are intended, by design, to only address health impacts resulting from direct air inhalation of mercury, in fact, have resulted in no reductions of mercury air emissions. The Department has had the authority to promulgate mercury air emission rules addressing mercury contamination in fish for the past 29 years, but has failed to do so. This is not entirely surprising given the difference in the state of researchers' understanding of mercury in the environment between then and now. In 1971, researchers and policy makers alike had little idea of the role mercury deposition played in the contamination of fish. The fact that a mercury limit addressing inhalation has already been established by the Department in no way prevents the Department from establishing a stricter standard addressing air deposition and the fish consumption route of exposure. The Department clearly must address air deposition in order to protect human health, fish and wildlife since fish consumption is the exposure route of greatest concern on the part of state health officials.

Assembly Bill 556 (of 1971) as introduced, only addressed direct mercury discharges to the water. However, the Assembly Natural Resources Committee adopted a substitute amendment (which became law) which broadened the bill to include solid waste disposal and air emissions, recognizing, to some extent, that all mediums (water, air and land) are connected and affect each other. The substitute amendment was introduced by Representatives T. Thompson and L. Mittness.

The crux of the authority issue is that the law was clearly intended to reduce mercury levels in fish and clearly gave the department the authority to do this by regulating both water discharge and air emission sources of mercury. And, in fact, water discharge sources of mercury whether from industries or from municipalities, have been, in a relative sense, greatly reduced; while air emission sources have gone completely unchecked. The fact that mercury levels in Wisconsin lakes and rivers have remained high (i.e. unsafe to the extent described in the state's fish consumption advisory) for the past 30 years is consistent with what we have learned about the role and importance of mercury deposition.


The DNR has clear, unquestionable statutory authority to adopt the requested rules. For the reasons set forth above, Petitioners urge that the requested rules be promulgated with all due expedience.

Dated this 18th day of May, 2000.

Respectfully submitted:




Keith Reopelle, Program Director
Wisconsin's Environmental Decade


Chuck Rolfsmeyer, President
Wisconsin State B.A.S.S. Federation



Gary Engberg
Gary Engberg Outdoors


Emily Kordus


Jim Wise, President
Environmentally Concerned
Citizens of the Lacland Area



Brian Burke, State Senator

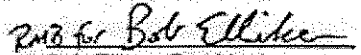
Spencer Black, State Representative



Ann T. Behrmann, M.D.
Pediatrician


Eric Uram
Sierra Club, Midwest Office

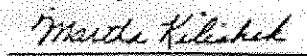

Gary Werner, Conservation Chair
Sierra Club, John Muir Chapter



Wayne Stroessner, President
Random Lake Association


Bob Elliker, President
Wisconsin Division of the Izaak
Walton League of America


William Kordus, Vice President
Twin City Rod & Gun Club


Russ Ruland, President
Muskellunge Club of Wisconsin

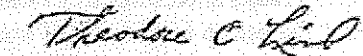

Martha Kilshek, President
Wisconsin Wildlife Federation


Donna Wilcox, Secretary
Last Wilderness Conservation Association, Inc.


Dean Kaufert, State Representative

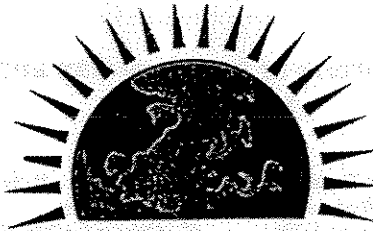

Joe Handrick, State Representative


John & Linda Badagliacco, Owners
Blueberry Hill Resort


Ted Lind, President
Wisconsin Council of Sport Fishing
Organizations

Over 100 Supporters of Mercury Cap and Reduction Legislation

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|---|--|--|--|
| ing/Conservation Groups | 31. Sturgeon For Tomorrow | 64. Citizens for a Better Environment | Communities of Color |
| Brillion Conservation Club | 32. Saint Croix Bass Anglers | 65. Citizens for Safe Water Around Badger Ammunition Plant | 87. Bad River Band of Lake Superior Tribe of Chippewas |
| Brown Co. Conservation Assn. | 33. Twin City Rod and Gun Club | 66. Citizens Protect West Twin River | 88. Great Lakes Inter-Tribal Council (GLITC) |
| Coleman Sportsman's Club | 34. Underhill Sportsmans Club | 67. Citizens to Save Neenah Wetlands | 89. Lac Courte Oreilles Tribal Council |
| Green Bay Area Great Lakes Sport Fishermen | 35. Walleyes Unlimited | 68. Clean Water Action Council of WI | 90. Lac Vieux Desert Band of Lake Superior Chippewas |
| Hatfield Sportsmen's Club | 36. Waupaca Bass Club | 69. Door Co. Environmental Council | 91. Red Cliff Band of Lake Superior Chippewa Indians |
| Hudson Rod and Gun Club | 37. Westby Rod and Gun Club | 70. Environmentally Concerned Citizens of Lakeland Area | 92. St. Croix Tribal Council |
| Izaak Walton League—State Division | 38. WI Council of Sportfishing Organizations | 71. Gibraltar Preservation Council | 93. WI Indian Education Assn. |
| Izaak Walton League—Brown Co. | 39. WI B.A.S.S. Federation | 72. Gray Panthers of WI | 94. Hmong American Partnership Fox Valley, Inc. |
| Izaak Walton League—Green Lk. Area Chpt. | 40. WI Society of Ornithology | 73. Lake Superior Greens | 95. Hmong Association of Green Bay |
| Izaak Walton League—Sheboygan Co. Chpt. | 41. WI Wildlife Federation | 74. Last Wilderness Conservation Association | Resorts |
| Izaak Walton League—South West WI Chpt. | 42. Wolf River Bass Club | 75. Madison Audubon Society | 96. Blueberry Hill Resort |
| Izaak Walton League—Watertown Chpt. | 43. Yahara Fishing Club | 76. Mid-West Renewable Energy Assn. | 97. Chief Lake Lodge |
| Kendall Sportsmans Club | Lake Associations | 77. Northern Thunder Partnership | 98. Chippewa Pines Resort |
| Lancaster Co. Conservation Club | 44. Beaver Dam Lake Mgmt. District | 78. Pollution Prevention Partnership | 99. Ladwig's Pine Arbor Resort |
| Lincoln Co. Sports Club | 45. Big Cedar Lake Assn. Organization | 79. POW'R (Protect Our Wolf River) | 100. Loon's Nest Lodge |
| Machickanee Sportsmens Club | 46. Big Eau Pleine Citizens Organization | 80. River Alliance of WI | 101. Musky Shores Resort |
| Mauston Bass Busters | 47. Big Portage Lake Riparian Owner Assn. | 81. Riverside Urban Environmental Center | 102. Norwood Haven Resort |
| Muskellunge Club of WI | 48. Chippewa Flowage Area Property Owner's Assn. | 82. Sierra Club—Midwest | 103. Pat's Landing Resort |
| New Lisbon Sports Club | 49. Foster Lake Assn. | 83. Sierra Club—Great Lakes Program | 104. Pinewood Lodge |
| Norwalk Rod and Gun Club | 50. Ike Walton Lake Assn. | 84. Sierra Club—River Touring Club of the John Muir Chpt. | 105. Reeder's Recess Resort |
| Oconto Co. Sportman Alliance | 51. Lake Noquebay Rehab. District | 85. Waukesha Co. Environmental Action League | 106. Sandy Point Resort |
| Olin-Badger Conservation Club | 52. Long and Bass Lake Assn. | 86. Wisconsin's Environmental Decade | 107. Sunset Lodge |
| Otter St. Fishing Club | 53. Mead Lake Club | | 108. Tomah Ridge Resort |
| Pewaukee Lake Sportsman's Club | 54. Miller Lake Assn. | | 109. Trails End Resort and Campground |
| Red River Sportsman's Club | 55. Namakagon Lake Assn. | | Other Organizations |
| Reel Hooked Fishing Team and Guide Service | 56. Pike Lake Protection and Rehab. District | | 110. Madison Chpt. National Organization of Women |
| Rick Writz Guide Service | 57. Random Lake Assn. | | 111. Physicians for Social Responsibility |
| Rod-Bender Guide Service | 58. Snipe Lake Assn. | | 112. Random Lake Lions Club |
| Sheboygan Co. Conservation Assn. | 59. Spider Chain O'Lakes Assn. | | 113. WI Committee on Occupational Safety and Health |
| Standing Cedars Community Land Conservation Assn. | 60. Tomahawk Lake P.O. Assn., Inc. | | 114. WI National Organization of Women |
| | 61. WI Association of Lakes | | |
| | Environmental Groups | | |
| | 62. Aldo Leopold Audubon Society | | |
| | 63. Citizens for an Independent DNR | | |



WISCONSIN'S ENVIRONMENTAL DECADE

September 15, 2000

Dear Secretary Meyer and the Natural Resources Board,

A petition was submitted to the Department of Natural Resources on May 18, 2000, requesting the adoption of rules to govern mercury emissions from the largest sources which contribute to mercury deposition to Wisconsin's lakes and rivers. Over three months and two Natural Resources Board meetings later, no action has been taken to reduce harmful mercury pollution. Imagine the number of anglers and their families who, because of a lack of awareness of the fish consumption advisory, ate mercury-contaminated fish and placed their health in jeopardy over the summer.

For a number of reasons listed in this letter, Wisconsin's Environmental Decade and other previous petitioners feel strongly that immediate action is needed to address and reduce mercury pollution. Therefore, we are submitting a second mercury petition with amendments and additional petitioners.

The most notable substantive amendment is the deadline by which mercury emitters must achieve 90% reductions-2010 instead of 2015. This change was made for a variety of reasons:

- Three out of four federal bills addressing mercury emissions have 2005 as the date for maximum reductions (making our request quite reasonable.)
- The EPA has identified a combination of control technologies that reduce mercury stack emissions by a minimum of 70%.
- Wisconsin Electric Power Company, as part of the XL Program, has pledged to voluntarily decrease mercury emissions by 40% in 2010. Only months ago, WEPCO testified against Senate Bill 177, which would have required a 50% reduction in the same time, claiming that no technology existed to reduce mercury from coal-fired power plant emissions.
- The National Academy of Sciences released a report in July estimating 60,000 children are born in the United States each year that may have neurological problems and difficulty in school because of their mother's consumption of mercury-contaminated fish. Further estimates using Wisconsin population numbers estimate that approximately 1200 of those children will be born into Wisconsin families. The estimate is likely conservative because of our massive concentration of lakes and our great fishing tradition.

For these reasons, the Great River Council of the Federation of Fly Fishers, the Anishinaabe Nijii/Protect the Earth W.A.T.E.R Campaign, the Green Bay Area Great Lakes Sport Fishermen, the Brown County Conservation Alliance, a DNR Certified Angling Instructor, Wisconsin Public Interest Research Group, and the River Alliance of Wisconsin join the previous petitioners in urgently requesting that rules to reduce mercury pollution from the largest sources be written quickly.

Sincerely,

Keith Reopelle, Program Director

122 State Street, Suite 200, Madison, WI 53703-2500 608.251.7020 Fax 608.251.1655 www.wienvdecade.org

3-20-07 10:14 AM

Before The State of Wisconsin Department of Natural Resources

PETITION BY CITIZENS FOR THE ADOPTION OF RULES TO GOVERN MERCURY EMISSIONS TO THE AIR AND SPECIFICALLY REQUIRING REDUCTIONS FROM THE LARGEST SOURCES OF MERCURY EMISSIONS WHICH CONTRIBUTE TO MERCURY DEPOSITION TO WISCONSIN LAKES AND RIVERS

Citizen Petition for Rules Docket No. _____

TO: Secretary of the Department of Natural Resources, and the
Natural Resources Board
P.O. Box 7921
Madison, Wisconsin 53707

The undersigned citizens of the State of Wisconsin hereby petition the Wisconsin Department of Natural Resources (WDNR) and the Natural Resources Board to conduct rulemaking to adopt administrative rules which require the reduction of mercury emissions to the air, which are subsequently deposited in surface waters and bioconcentrate in game fish, from the largest known sources of such emissions under the authority given to the Department in section 285.11 (9) Wis. Stats.

This petition is filed pursuant to the provisions of 227.11 (2) (a) and 227.12 (1) and (2), Wis. Stats., and Wisconsin Administrative Code NR 2.05. A petition for rulemaking must state the substance or nature of the rule requested, the reason for the request, the petitioners' interest in the requested rule, and a reference to the agency's authority to promulgate the requested rule, 227.12 (2), Wis. Stats. This petition fulfills these requirements and describes why rules are urgently needed.

PETITIONERS

Petitioner Phil Emmling joins in this petition as an angler and as the Vice President of the Great River Council of the Federation of Fly Fishers, whose membership is 800. Many anglers within the group fish for species that are not frequently affected by mercury, such as trout. However, largemouth and smallmouth bass are fished often, and also appear on every page of the Wisconsin fish consumption advisory for mercury. The group feels strongly that mercury reduction is essential to protect the health of people and fisheries.

Petitioner Sandy Lyon joins in this petition as Executive Director of Anishinaabe Nijii/Protect The Earth's W.A. T.E.R. Campaign, whose mission it is to bring together the Native and Non-Native communities to protect the earth for Seven Generations yet to come. Sandy is concerned that poor people are significantly more threatened by mercury poisoning because of their reliance on fresh fish for food. Specifically, Sandy has seen the Anishinaabe in Northern Wisconsin and the Lake Superior region eating a great deal of large game fish, like walleye, that are associated with high mercury levels. She feels that mercury warnings are inadequate, and that it is unjust to delay action that will make fish a healthy food source for all.

Petitioner John Durben joins in this petition as President of the Green Bay Area Great Lakes Sport Fishermen (GBAGLSF) and individually as an angler spanning a period of over 45 years. John as well as members of GBAGLSF have serious concerns about the poisoning of Wisconsin's lakes through the emission of mercury contaminants. They are concerned about the affects of the consumption of mercury-laced fish both for this generation and generations to come. They believe that now is the time to reverse the current trend and adopt rules that will have a positive affect on our environment.

Petitioner Ron Vander Loop joins in this petition individually as a Wisconsin fisherman and as president of the Brown County Conservation Alliance (BCCA). A special concern is what the results of mercury contamination will be on the reproductive capacity in fish, wildlife and humans in the future. Myself and the twelve member clubs of the BCCA strongly support the requested rules recognizing that they are critical to making sport fish safe for consumption.

Petitioner Pete Petrouske joins in this petition individually as a longtime Wisconsin angler with young grandchildren and in my capacity as a Wisconsin Department of Natural Resources Certified Angling Instructor who has taught fishing classes at two different schools in Green Bay. I am very concerned with the mercury contamination of fish in Wisconsin's waters. Sport fish must be made safe for consumption by our young anglers.

Petitioner Kerry Schumann joins in this petition as the Director of the Wisconsin Public Interest Research Group (WISPIRG). WISPIRG is a nonpartisan, nonprofit public interest organization advocating for a safe and healthy environment. WISPIRG is concerned about the impact mercury has on Wisconsin's environment and the health of Wisconsin's citizens. With a known 853 river miles and 117,000 lake acres under mercury advisory 1 Wisconsin is in need of strong rules to eliminate more mercury entering our environment. WISPIRG is particularly concerned with addressing the largest source of mercury contamination -coal-fired power plants. WISPIRG has about 15,000 members across the state of Wisconsin.

Petitioner Todd Ambs joins in this petition as an angler and as Executive Director of the River Alliance of Wisconsin, which has a membership of 1500 individuals and businesses that believe a healthy river is the heart of a healthy community. Segments of major rivers, such as the Wolf and Wisconsin, have mercury warnings for certain fish. Additionally, many of the rivers on the Impaired Waters List are so designated because of mercury. Reducing mercury emissions from the largest sources, coal-burning power plants, would help restore the health of these rivers while protecting others from future mercury pollution.

II. NATURE OF THE REQUESTED RULES

The petitioners request Wisconsin DNR and the Natural Resources Board to promulgate the following:

1) A rule which creates a comprehensive program in the DNR for addressing mercury in the environment including:

- mercury deposition and monitoring activities --other mercury research
- public information and education outreach in coordination with the Health Dept. --technical assistance for stationary sources of mercury
- cooperative mercury reduction activities with neighboring states and federal government
- activities to reduce mercury emissions from small (purposeful use) sources --activities to address problems associated with long-term storage of mercury --activities to address the effectiveness of this program for reducing mercury in the environment
- activities to minimize the release of mercury into the environment from coal ash and other solid waste streams
- any other component identified by the Department

2) A rule which requires the Department to appoint a mercury control council of up to 12 members, including representatives from environmental and sport fishing organizations, Native American tribes, health and industry professionals, for the purpose of advising the department on mercury reduction strategies and activities.

3) A rule which requires the Department to determine a baseline mercury emission level for each regulated source by averaging the annual mercury emissions in 1997, 1998 and 1999.

4) A rule which requires the Department to place a cap on 1999 emissions from each regulated and non-regulated source and not allow any new sources of mercury or modifications at existing sources which result in increased emissions unless that source obtains mercury emission reductions equal to 150% of the annual mercury emission increase.

5) A rule which requires the Department to require a 90% reduction in mercury emissions by the year 2010 from:

- all utility boilers with more than 10 pounds of mercury emissions in a year
- all government-owned boilers with more than 10 pounds of mercury emissions in a year
- all municipal waste incinerators --all medical waste incinerators --all chlor-alkali plants
- other sources of mercury air emissions the Department determines to be significant and reasonably (in terms of technology and cost-effectiveness) regulated. (Utility and government-owned boilers would not be required to reduce below 10 pounds of mercury emissions in a year.)

6) A rule which requires the Department to set any interim reduction requirements for regulated sources above that it deems useful including at least a 25% reduction by the year 2006.

7) A rule which requires fines and other disincentives for non-compliance with the caps and reductions required above.

8) A rule which allows that if the department, in conciliation with the Public Service Commission, determines that compliance with any of the reduction requirements is not technically feasible, would jeopardize electric reliability or cause unreasonable hardship, the department may issue a variance for up to 2 years from part or all of the requirement as long as the variance will not result in undue harm to human health or the environment.

III. REASONS FOR THE REQUEST

1) The Wisconsin Department of Natural Resources (DNR) and the Wisconsin Department of Health and Social Services (DHSS) jointly release an annual fish consumption advisory (Important Health Information For People Eating Fish From Wisconsin Waters) which currently warns anglers and their families to not eat certain fish from 341 lakes and rivers (approximately one out of every three tested) due to unsafe levels of mercury contamination. This list will continue to grow as the Department continues to test additional lakes. Approximately one out of every three lakes tested ends up on the advisory .

- 2) The Health Department warns pregnant women not to eat certain large game fish from all Wisconsin lakes that have not been tested. -
- 3) The most common fish species listed on the health advisory is walleye which is also one of the most sought after game fish for eating.
- 4) Mercury is a neuro-toxin which means that it adversely impacts the brain and nervous system making small children and pregnant women and their fetuses particularly susceptible to mercury poisoning.
- 5) Mercury stays in the body for a relatively long period of time (half life of 30 to 120 days) so that mercury contaminated fish meals eaten prior to pregnancy can impact the fetus.
- 6) Chronic exposure to mercury contaminated fish prior to or during pregnancy can result in infants and children with lower I.Q.s, reduced attention span, reduced memory capacity, reduced motor skills, and other mental and physical impairments.
- 7) Acute exposure to mercury contaminated fish prior to or during pregnancy can result in infants with severe mental and physical retardation.
- 8) Acute exposure to mercury contaminated fish in Wisconsin has led to at least one case of acute mercury poisoning where the individual, Henry Henk (Hayward), lost 100 pounds of weight, lost the use of his legs, suffered severe dementia (didn't recognize his own wife), and nearly died.
- 9) Fish consumption is the route of human exposure to mercury of greatest concern and there are currently no regulations of mercury emissions which take this route of exposure into account.
- 10) The presence of mercury in combination with other contaminants found in Wisconsin fish, such as PCBs, increases the likelihood of adverse health impacts at lower levels of mercury contamination.
- 11) Levels of mercury found in commercially sold fish in stores or restaurants (e.g. canned tuna) are, on average, about half of what they are in fish caught from Wisconsin waters listed on the health advisory. The fish consumption advisory assumes no consumption of commercially sold fish, underestimating the risk for anyone who does eat fish from the store or a restaurant.
- 12) The Department of Natural Resources sells over 1 million fishing licenses but only publishes 40,000 fish consumption advisories. The vast majority of anglers and their families never see the fish consumption warnings for mercury contamination.
- 13) The Environmental Protection Agency and Wisconsin DNR have identified coal-fired power plants as the largest sources of mercury emissions nationwide and in Wisconsin respectively. Yet, mercury emissions from coal-fired power plants are not meaningfully regulated.
- 14) The U.S. Environmental Protection Agency (EPA), Northeast States for Coordinated Air Use Management (NESCAUM) and other government agencies have identified numerous mercury removal control technologies currently available for electricity generating boilers including coal cleaning, wet scrubbers, dry scrubbers, fabric filters, combined ESP/baghouse and other combinations of existing technologies.
- 15) Studies have linked mercury contamination to impaired reproduction in wildlife, particularly loons and other fish-eating species.
- 16) In at least one DNR research project, reduced hatching success and reduced survival of embryos were associated with high mercury concentrations in walleye eggs from two northern Wisconsin lakes.

17) Nearly two million people fish in Wisconsin and spend nearly \$1 billion each year. In 1996, fishing license sales alone totaled \$26 million. More than 30,000 jobs in the state depend on sport fishing; sport fishing in Wisconsin depends on clean lakes, clean rivers and clean fish.

18) Certain cultures are at greater risk of adverse health impacts resulting from consumption of mercury contaminated fish due to their tendency to engage in semi- subsistence fishing. Certain Native American tribes, for example, rely heavily on game fish as a food source, as do certain Hmong communities.

19) More than 100 organizations have passed resolutions (see attached) supporting a policy to reduce mercury emissions in Wisconsin, including more than 40 sport fishing organizations, numerous lake associations, environmental groups, resort owners, Native American tribes and other groups representing communities of color which are disproportionately impacted by mercury contaminated fish.

20) Until states with the greatest mercury contamination in lakes and fish (e.g. Wisconsin), and therefore extensive fish consumption advisories, take action to reduce their own mercury emissions, there is little hope of receiving cooperation from upwind states with few, if any, fish consumption advisories (e.g. Illinois, Missouri, Texas, etc.).

IV. AGENCY AUTHORITY TO ADOPT REQUESTED RULES

The Department of Natural Resources is provided with direct and clear authority to promulgate the rules requested in this petition under 285.11 (9) Wis. Stats., which instructs the Department to "Prepare and adopt minimum standards for the emission of mercury compounds or metallic mercury into the air." The bill which created this law was 1971 Assembly Bill 556, introduced by (then) Representative Tommy G. Thompson and two other legislators. The bill was clearly in response to high levels of mercury in Wisconsin River fish which prompted Governor Warren Knowles to close 40 miles of the Wisconsin River to fishing for two months in 1970.

The law created by this bill, Chapter 272, Laws of 1971, had three components: one restricting mercury discharges to the water, one requiring a materials balance sheet for purposeful use of mercury (addressing disposal), and a third (section 1' 144.422) requiring that the department "prepare and adopt minimum standards for the emission of mercury compounds or metallic mercury into the air." This requirement creates clear and direct authority for the DNR to promulgate the rules requested in this citizens' petition.

The Department did adopt mercury air emission standards in response to the passage of this law. However, the current air toxics standards are intended, by design, to only address health impacts resulting from direct air inhalation of mercury, in fact, have resulted in no reductions of mercury air emissions. The Department has had the authority to promulgate mercury air emission rules addressing mercury contamination in fish for the last 29 years, but has failed to do so. This is not entirely surprising given the difference in the state of researchers' understanding of mercury in the environment between then and now. In 1971, researchers and policy makers alike had little idea of the role mercury deposition played in the contamination of fish. The fact that a mercury limit addressing inhalation has already been established by the Department in no way prevents the Department from establishing a stricter standard addressing air deposition and the fish consumption route of exposure. The Department clearly must address air deposition in order to protect human health, fish and wildlife since fish consumption is the exposure route of greatest concern on the part of state health officials.

Assembly Bill 556 (of 1971) as introduced, only addressed direct mercury discharges to the water. However, the Assembly Natural Resources Committee adopted a substitute amendment (which became law) which broadened the bill to include solid waste disposal and air emissions, recognizing, to some extent, that all mediums (water, air and land) are connected and affect each other. The substitute amendment was introduced by Representatives T. Thompson and L. Mittness.

The crux of the authority issue is that the law was clearly intended to reduce mercury levels in fish and clearly gave the department the authority to do this by regulating both water discharge and air emission sources of mercury. And, in fact, water discharge sources of mercury, whether from industries or from municipalities, have been, in a relative sense, greatly reduced; while air emission sources have gone completely unchecked. The fact that mercury levels in Wisconsin lakes and rivers have remained high (i.e. unsafe to the extent described in the state's fish consumption advisory) for the past 30 years is consistent with what we have learned about the role and importance of mercury deposition.

The DNR has clear, unquestionable statutory authority to adopt the requested rules. For the reasons set forth above, Petitioners urge that the requested rules be promulgated with all due expedience.

Dated this 18th day of September, 2000.

Respectfully submitted:

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Sandy Lyon, Executive Director
Anishinaabe Nijiji/Protect the Earth
W.A.T.E.R. Campaign

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Brown County Conservation Alliance

John E. Durben
John Durben, President
Green Bay Area Great Lakes
Sport Fishermen

Todd Ambs
Todd Ambs, Executive Director
River Alliance of Wisconsin

Kerry Schumann
Kerry Schumann, Director
Wisconsin Public Interest Research Group

Summary of Mercury Emission Reduction Activities in Other States

Other States

Forty-four states have some type of fish consumption advisory related to mercury contamination. A number of these states have initiated actions to reduce mercury emissions to the atmosphere from sources located within their respective state. These include:

Connecticut – In March 2003, a legislative proposal was presented to the Connecticut legislature that would require mercury emission reductions from coal-fired power plants. The proposal was jointly issued by the Connecticut Coalition for Clean Air, Clean Water Action, Clean Air Task Force, and PSEG Power Connecticut. It would require an emission standard of 0.6 pounds of mercury per trillion BTU (90% control efficiency) by 2008.

Maine – Enacted legislation in 1998 to limit mercury emissions by any source to 100 pounds per year by the year 2000 and 50 pounds per year by the year 2004.

Massachusetts – In 2001, the state passed the Emission Standards for Power Plants regulation requiring the state's power plants to reduce their emissions of four pollutants including mercury. Plant owners were required to stack test for mercury emissions with their emissions capped based on annual averages. In December 2002, the Department of Environmental Protection issued a technological and economic feasibility study of mercury emission reductions. The Department believes that the removal of 85–90+% of mercury in the flue gas has been demonstrated to be technologically and economically feasible. The Department is required to propose mercury emission standards in 2003 that power plants will need to meet by October 1, 2006.

Michigan – Initiated an active stakeholder forum discussing strategic issues regarding mercury reductions. The Michigan Mercury Action Plan Task Force released a report on mercury pollution in 1997. The report recognized the need to reduce mercury emissions from coal-fired power plants although it did not make any recommendations on the level of emission reductions.

Minnesota – In 1999, Minnesota passed a mercury reduction law that included establishment of an Advisory Council. The Minnesota Pollution Control Agency is currently implementing the Advisory Council's recommendation for a 70% reduction in mercury emissions from 1990 levels by 2005. Minnesota's mercury reduction initiative is an industry voluntary program approved by the state legislature.

New Hampshire – In January 2001, the Governor of New Hampshire announced a Clean Power Strategy that when implemented, will reduce emissions including mercury from fossil fuel power plants. The strategy calls for mercury reductions of 75% from 1990 levels. Legislators from both parties have agreed to sponsor the New Hampshire Clean Power Act, legislation to implement the strategy.

New Jersey – In January 2002, the state's Mercury Task Force released a report that recommends a reduction from 2001 mercury emissions of 50 percent by 2006 and a 65 percent by 2011. The report recommends that these reductions come from increased use of pollution control technologies by power plants and an increased use of other forms of power production.

North Carolina – The North Carolina Scientific Advisory Board released a report "Mercury in the Environment" in 2000. The report expresses concerns with mercury emissions from power plants although it did not make any recommendations on mercury reductions. The Clean Smokestacks Bill, passed in June 2002, requires the North Carolina Department of Environment and Natural Resources to continue to evaluate mercury pollution issues and make recommendations and standards on the control of mercury emissions.

Oregon – The Oregon Department of Environmental Quality released a Mercury Reduction Strategy in November 2002. The report recommends a reduction in all mercury releases from 2001 emissions of 50 percent by 2006 and 75 percent by 2011.

Vermont – An Advisory Committee on Mercury Pollution was formed in 1998. The Committee is charged with examining the mercury risk in Vermont and methods of controlling mercury emissions and contamination.

Northeast – The Conference of New England Governors and Eastern Canadian Premiers signed a plan in May 1998 which establishes a regional goal of reducing mercury emissions by 50% by the year 2003 and a 75 percent reduction by 2010.

**Summary of Current Mercury Monitoring and Research
Activities in Wisconsin**

Wisconsin Mercury Monitoring And Research Activities (July 2003)

The following is a list of mercury research and monitoring activities that are either directly being conducted by the Department or the Department is involved in some type of capacity. The list includes long-term ongoing projects as well as those that recently received funding in 2002 or 2003.

Air Monitoring

Deposition - The Department operates 6 mercury wet deposition sites as a part of a national mercury network that currently has over 80 sites throughout the U.S. and Canada. The sites are located at Lake Geneva, Devil's Lake, Brule River, Trout Lake, Poppo River, and Milwaukee. Approximately \$110,000 from the Wisconsin Focus on Energy Environmental Research Program (Public Benefits) was approved in April 2003 to continue operation of 5 of the sites. Last year the Department received \$106,950 from the Public Benefits fund to operate the sites.

The wet deposition site located in Milwaukee began operation in October 2002. The site is located at the University of Milwaukee North Campus. It is funded by USGS and is operated by the Department. It is part of a USGS study to assess the bioaccumulation of mercury in diverse river systems and is the first urban deposition site in Wisconsin. Information about the mercury deposition program as well as historical data for the monitoring stations can be found at the National Atmospheric Deposition Program web site (<http://nadp.sws.uiuc.edu/>).

Ambient - A number of mercury surveys using a Lumex analyzer and TEXRAN analyzer have been conducted by the Department's air management program. The significant surveys include monitoring at Mercury Waste Solution in Union Grove, Vulcan Chemical in Port Edwards, Chiwaukee Prairie (near Pleasant Prairie electric utility plant), and Devil's Lake (near Columbia electric utility plant). Mercury Waste Solution is a large mercury recycling company and Vulcan Chemical is a chlor-alkali facility. A report on monitoring near the Vulcan Chemical Company was released and is available on the DNR's web site at: (<http://www.dnr.state.wi.us/org/aw/air/MONITOR/vulcangmon.pdf>). The results of the other surveys are now in review and expected to be reported in the near future.

Aircraft Monitoring - In August 2002, the Department began monitoring mercury in the air above Lake Superior using aircraft and gold traps for long duration samples. The project was completed with the last flight completed on February 17, 2003. Data will be reviewed and a report will be made available in the future.

Biomonitoring – A one-year study of mercury levels near the Chlor-alkali plant in Port Edwards (Vulcan Chemicals) was completed in 1991. The study used lichens as bioaccumulators to capture ambient gaseous mercury as well as wet and dry deposition mercury. Mercury monitoring with the same technique has been ongoing at one of the original sites located 250 meters east of the plant. This data set represents the only long-term mercury monitoring in the area of the plant and indicates decreasing levels during summer and fall periods in recent years. The decrease in mercury levels may be the result of process and equipment changes at the plant.

Two additional terrestrial biomonitoring studies are in the analysis phase. They include an examination of mercury accumulation in trembling aspen leaves in southern Wisconsin, and mercury accumulation in forest soils near the former Copper Range smelter in White Michigan. The later study is being supplemented with additional field investigations this fall.

Fish Monitoring

Fish Species – Fish have been tested from a total of about 1200 water bodies since the 1970's. The early focus was on rivers receiving effluents from industries known to discharge mercury. In the 1980's, the focus was on northern lakes. The goal of the current program is to increase the number of water bodies where fish have been tested for mercury and assess whether newly monitored water bodies and fish species are covered by the statewide "Safe Eating Guidelines" or if more stringent advice is necessary.

In July 2002, the Department's Fisheries Management and Habitat Protection Program was approved for funding in the amount of \$85,984 by the Wisconsin Focus on Energy Program (Public Benefits) to monitor mercury in selected fish species (contracts in development). This is a two-year project to examine existing data for trend information and develop a monitoring design to evaluate trends in fish over time.

Wildlife Monitoring

River Otters – The Department was approved by USEPA for \$45,000 in FY 2002 to sample mercury concentrations in the tissue of river otters (*Lutra canadensis*) located in Wisconsin. A four-county sampling area was identified in each of the three otter trapping zones (Northern, Central, and Southern). Successful otter trapping applicants in the identified counties were asked to donate their otter carcasses for the study. With cooperation from the Wisconsin Trapper's Association, over 80 carcasses have been donated to date.

Tissue from the carcasses has been submitted to a lab for mercury analysis. The analysis will provide data regarding the distribution and relationship of mercury within different tissues (brain, liver, kidney, and muscle). Comparisons will be made and differences identified between mercury levels in otter from high mercury and low mercury systems. Available fish mercury data will be utilized to estimate exposure of mercury to otters.

Similar collections will be made from the same counties in 2003 – 2004. During this time, the relationship between fur and tissue mercury concentrations will be evaluated. A positive relationship could be used as a potential non-lethal biomarker and long-term biomonitoring tool to indicate possible mercury related stresses and impacts. A final report is expected in December 2004.

Research

Little Rock Lake (Vilas County) – Research by Dr. Carl Watras (Integrated Science Services) at Little Rock Lake in northern Wisconsin suggests that lakes may respond even more rapidly to changes in atmospheric mercury deposition than they did to the declines in acid rain and sulfur dioxide emissions. His data shows that from the period 1995 to 1999, atmospheric mercury deposition to the lake has decreased 10 percent per year and the lake water mercury concentration has decreased 5 percent per year. For the period 1994 to 2000, the mercury concentration in the lake's yellow perch has decreased 5 percent per year. The decrease in atmospheric mercury deposition may be the result of a ban on mercury in house paint, removal of mercury from batteries, or the closure of the Copper Range smelter located in White Pine, Michigan.

Since 1999, atmospheric deposition has partially rebounded. The cause is unknown and not simply due to more rainfall. Recent legislation (Chapter 30.204(1)) authorizes the Department to continue monitoring the Little Rock Lake reference basin through January 1, 2008 so that future changes in mercury deposition and lake-water concentrations can be documented and compared to trends in mercury emissions. In addition, three other lakes will be monitored including Crystal Bog, Trout Bog, and Devil's Lake (Forest County). In the coming months, lake data will be examined for indications of their response to the increase in mercury deposition. Fish will likely be assayed in 2004 or 2005. Funding for this effort is currently provided from the Lake Superior Basin Trust and the Forest County Potawatomi Community.

Devil's Lake In Forest County (Potawatomi Reservation) – In May 2001, the Department received a grant from the Forest County Potawatomi Community to cooperate on a study of atmospheric deposition and biogeochemistry of mercury and other trace contaminants in aquatic ecosystems. Dr. Carl Watras is the project manager. The study focuses on the Devil's Lake watershed in Forest County and Little Rock Lake in Vilas County. Atmospheric mercury is delivered to Devil's Lake by direct deposition and channelized runoff from a wetland. Since wetlands are suspected of being an important source of methyl-mercury to receiving waters, the study will permit researchers to assess the relative importance of in-lake to watershed processes. The study period is for five years to accommodate a range of hydrological conditions.

The Department is also cooperating with the Potawatomi Tribe in the development of an atmospheric monitoring station for the Devil's Lake watershed. This includes bulk mercury deposition, atmospheric particulates, wet chemistry monitors, gas phase monitors (gaseous mercury, ozone, and sulfur dioxide), and meteorological instrumentation. The objective is to enhance the understanding of atmospheric processes

that deliver mercury to the watershed and compare them to the processes operating in the Little Rock Lake airshed.

Trout Lake – Two new mercury monitoring activities were started last year by Dr. Carl Watras at the Trout Lake research station. One project involves continuous monitoring of gas phase mercury using a Tekran analyzer that samples air at 5-minute intervals. This study will help assess air-borne mercury and the atmospheric processes that deliver mercury from the air to the lake. A second project involves through-fall sampling to quantify the effects of forest canopy on atmospheric mercury deposition.

Loons – Dr. Mike Meyer (Integrated Science Services) has been studying the impact of mercury exposure on common loon reproduction for a number of years. Loons have the highest level of mercury exposure of all wildlife species tested in Wisconsin. His study involves a number of collaborators and funding sources including USGS, University of Wisconsin, Wisconsin Utilities Association, and EPRI (Electric Power Research Institute).

Included in Dr. Meyer's research are field epidemiological studies, dose-response work where captive loons are fed fish with high concentrations of mercury, and pharmacokinetic modeling where loon tissue mercury levels are predicted on the basis of fish mercury content. The project goal is to establish fish mercury levels that safeguard loon reproductive health in Wisconsin. Recent significant findings include: 1) reduced reproductive success on acidic lakes where mercury exposure is greater; 2) no significant effect of mercury dose on loon chick growth and survival; 3) reduced growth rates, immune response, behavioral and physiological changes in loons hatched from eggs collected on acidic lakes; 4) a non-significant but consistent trend towards lower immune response in chicks fed a high mercury dose. Lake pH is an important ecological confounding factor that may cause effects correlated with mercury exposure.

In July of 2002, Dr. Meyer's loon study was approved for additional funding of \$221,684 from the Wisconsin Focus on Energy and the Environment Program (Public Benefits) to collaborate with USGS to conduct an additional dosing experiment to investigate the impact of mercury on chick immune function and physiology. In addition, Dr. Meyer received a \$490,000 USEPA STAR grant to develop a loon demographic model and population estimate for a 5 county area of northern Wisconsin. The main goal of the project is to evaluate the impact of numerous stress factors, including mercury exposure, on loon population demographic parameters.

Lichens – Martha Makhholm (Air Management Bureau) and Dr. Susan Will-Wolf (UW-Madison) were approved this year in the amount of \$39,134 for their research proposal: Lichen Bioaccumulation and Bioindicator Study near Alliant Columbia Generating Facility. Funds are from the Wisconsin Focus on Energy Program (Public Benefits). The Air Management Bureau is matching the grant with funds and in-kind support.

UW Madison – Dr. Jamie Schauer and Dr. Jim Hurley with UW/Madison, along with others, received approval for funding from the USEPA Star Grant program (FY 2002) in the amount of \$898,388 to quantify key atmospheric transformations that impact the fate of mercury in transport from sources to receptor sites. This study includes expanded mercury monitoring at the Devil's Lake monitoring site. In FY 2001, Dr. Hurley (then associated with the Department) received \$140,000 from USEPA under S.105 Great Lakes funds, to study the atmospheric fate and transport of methyl-mercury in the Great Lakes basin. For the two projects listed above, both Dr. Schauer and Dr. Hurley have agreed to work cooperatively with the Department.

EPRI – The Department is cooperating with the Electric Power Research Institute (EPRI) to research mercury chemistry in power plant plumes. EPRI was approved in 2002 in the amount of \$121,530 for the study from the Wisconsin Focus on Energy Program (Public Benefits).

Modeling

Devil's Lake (Sauk County) TMDL – The USEPA continues its work on the Devil's Lake TMDL pilot project with cooperation from the Department. The purpose of the project is to determine through modeling, the atmospheric sources of mercury to the lake and to combine the air deposition loading with water quality modeling to predict the lake response to mercury reductions. Additional air model runs were made during 2002. A final report should be available by the end of 2003.

Atmospheric Modeling System – The air management program is developing an atmospheric mercury modeling system for the Great Lakes region. Partial funding (\$95,000) for the project was received in 2001 from USEPA under S. 105 Great Lakes funds. The project includes atmospheric mercury modeling, meteorological modeling, regional emissions modeling, mercury inventory development, data analysis, and mercury monitoring. The project should be completed by the end of March 2004.

BARR Engineering – The Department has contracted with BARR Engineering of Minnesota to prepare a model to predict the air water, and land discharge of mercury to the environment from the flow of mercury-containing products into the state. The model was completed in June 2003 and is capable of assessing how mercury impacts may be altered by different management approaches such as product bans or improved recycling. The products include dental amalgam, fluorescent lamps, non-fluorescent lamps, bulk liquid mercury, switches and relays, automobile switches, thermostats, measurement and control devices, and thermometers.