



The Izaak Walton League of America



Reducing Mercury Pollution: Workable Solutions for Minnesota's Waters



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This report is also available at www.iwla.org/cleanair.



Mission Statement: To conserve, maintain, protect, and restore the soil, forest, water, and other natural resources of the United States and other lands; to promote means and opportunities for the education of the public with respect to such resources and their enjoyment and wholesome utilization.

The Izaak Walton League's 40,000 members share our nation's stewardship responsibilities and are dedicated to the common-sense conservation benefiting the nation's wildlife, fisheries, and the outdoors they depend on. The League has chapters in approximately three hundred communities nationwide. Our headquarters is in Gaithersburg, Maryland, and we have a regional office in St. Paul, Minnesota.

Introduction

As the “Land of 10,000 Lakes,” Minnesota enjoys a rich tradition of outdoor recreation. Fishing alone contributes \$2.8 billion to the state’s economy annually.¹ Lakes, rivers, woods, and prairies are a strong part of its identity. The Izaak Walton League of America, whose first national president hailed from Minnesota, has protected this identity for more than eight decades.

Today, mercury contamination from coal-fired power plants and other industrial sources threatens this identity. Fish caught from the state’s waters are increasingly contaminated with mercury, a known toxin. Because children are highly susceptible to the adverse effects of mercury, women of child-bearing age, pregnant women, and children must be careful about how much bass, walleye, northern pike, and other sportfish they eat. Fishing is not the safe family activity it used to be.

Reducing mercury contamination has been a priority for Minnesotans since the early 1990s. Realizing that mercury continued to pose serious health risks, the Minnesota Pollution Control Agency (MPCA) formed the Mercury Contamination Reduction Initiative Advisory Council in 1997 to find solutions.

Representatives from Minnesota industries argued that mercury could be reduced voluntarily by 1,000 pounds per year by 2005.² Through a consensus process, the Minnesota Mercury Contamination Reduction Initiative agreed to a goal of reducing mercury emissions by 60 percent by 2000 and 70 percent by 2005. The goals were passed in legislation in 1999.

Unfortunately, the goals are not on track to be met. Our analysis demonstrates a reduction of only 5 percent. More than 3,600 pounds of toxic mercury continue to be emitted in Minnesota each year.³

New technology is available that could reduce mercury emissions from coal-fired power plants even further. Research is also underway to reduce emissions from the taconite industry. Minnesota must make it economically feasible for businesses to invest in mercury control technologies. The Minnesota law creating the Emissions Reductions Rider is a good example of how incentives can work.

Because some of Minnesota’s mercury pollution comes from neighboring states, strong federal regulations are also needed. The U.S. Environmental Protection Agency (EPA) has proposed a rule to control emissions from coal-burning power plants, but the League and the MPCA both agree that the proposal will not be enough.

In this report, the Izaak Walton League argues for the following actions:

- Strengthening the pending federal mercury rule before it is finalized next year;
- Extending the state’s Emissions Reduction Rider;
- Providing authority to state agencies to require sector-specific or facility-specific mercury reductions;
- Increasing funding for research and development of taconite mercury controls; and,
- In the absence of a strong federal mercury rule, passing state legislation that requires mercury reductions in Minnesota.

Minnesota’s waters, fisheries, and outdoor recreation heritage must be protected.



Why Mercury Is a Problem

Mercury is a naturally occurring element normally found in rocks, soils, and oceans. Since mercury is an element, it never breaks down into a less dangerous form. Instead, it persists in the environment and can cycle for decades between land, air, and water until sediments eventually cover it. Although there are some natural sources of mercury, humans are responsible for nearly two-thirds of the mercury currently circulating in our environment.⁴

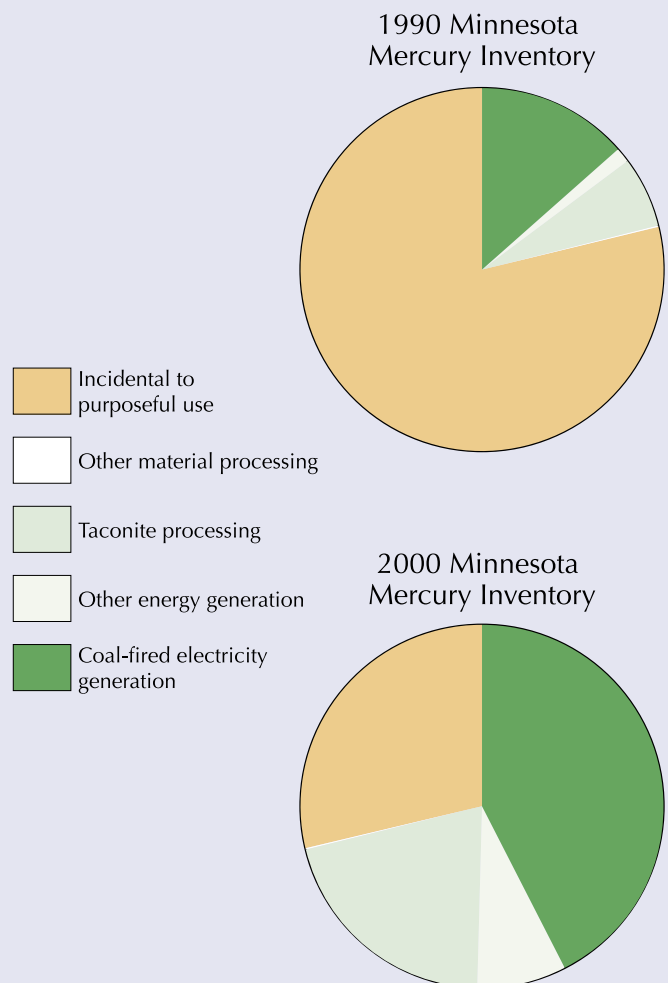
Once mercury reaches bodies of water, aquatic bacteria can convert it to methylmercury, a very toxic form that is dangerous to wildlife and humans. The bacteria are eaten by plankton, the plankton are eaten by small fish, and the small fish are eaten by larger fish. The methylmercury concentrates as it moves up the food chain. This process, known as bioaccumulation, explains why bigger and older fish contain the highest levels of mercury and pose the greatest danger to wildlife and humans.

Methylmercury is a potent neurotoxin that can adversely affect development of the human brain and nervous system. Even at low levels, it can delay mental development, cause learning disabilities and deficiencies in language, and impair motor function, attention, and memory.

The Minnesota Mercury Inventory

The MPCA worked with industries throughout Minnesota to develop a comprehensive mercury inventory for the state. The inventory includes releases of mercury to the air, water, and land as well as mercury-containing product manufacturing, use, and disposal.⁷

The League believes it is helpful to compare the 1990 and 2000 inventories and to identify the largest emitters. Coal-fired power plants and taconite processing are the single largest mercury-emitting industries in Minnesota. The “incidental to purposeful use” sector (products) as a whole accounted for 79 percent of the inventory in 1990 and only accounted for 29 percent of the inventory in 2000. Clearly, most of the mercury reductions since 1990 have occurred in the product sector, which is comprised of 20 smaller source categories.⁸ More reductions should be required of the sectors that have done little to date.



People are primarily exposed to mercury through fish consumption. Minnesota is one of 21 states to issue a statewide fish consumption advisory because of mercury. The Minnesota Department of Health advises women of childbearing age, pregnant women, and children to limit their intake of fish from every lake in Minnesota.⁵ Others who consume large quantities of sport fish should also be aware of the consumption advisories.

The concern about fish consumption is easily justified. The U.S. EPA recently reported that one in six women of childbearing age have mercury in their bodies at levels that may adversely affect their unborn child. This could affect up to 630,000 newborns in the United States each year.⁶

Evaluation of the Minnesota Mercury Contamination Reduction Initiative

This section examines the reasons why the Reduction Initiative did not succeed as intended. The voluntary agreements did not meet annual reduction potential of 1,000 pounds per year as recommended by the Advisory Council⁹ because:

- The design of the Reduction Initiative was inadequate to achieve the intended results;
- The effort was hampered by a lack of industry-specific goals and uniform reporting standards; and,
- The effort was not focused on direct mercury air emissions, which are the emissions of greatest concern because they are most likely to contaminate fish.

Inadequate Design

The Mercury Contamination Reduction Initiative is a project administered and evaluated by the MPCA. The Mercury Contamination Reduction Initiative's Advisory Council was created in 1997. The Advisory Council was comprised of representatives from industry, government, and nonprofit organizations (see Appendix I for list of participants). Its goal was to advise the MPCA regarding policies designed to reduce mercury contamination and recommend policy-oriented changes.

Decisions of the Advisory Council were made by consensus. Although stronger provisions for mercury reduction goals and reporting were proposed, the consensus process ultimately rejected them.

By 1999, the Advisory Council recommended quantitative goals to the Legislature. Minnesota Statute §116.915 was passed later that year and established a target for reducing mercury emissions in Minnesota by 60 percent from 1990 levels by 2000 and 70 percent of 1990 levels by 2005. The intent of the 1999 mercury reduction legislation was to ensure that the release of mercury in Minnesota continues to decline. Although legislation was passed, there is no requirement that facilities reduce emissions.

The U.S. EPA recently reported that one in six women of childbearing age have mercury in their bodies at levels that may adversely affect their unborn child. This could affect up to 630,000 newborns in the United States each year.⁶

The MPCA faced a great challenge trying to manage a voluntary program. According to the MPCA, the Advisory Council members “insisted that there should be no state mandates. No firm should be forced to (a) develop a voluntary agreement, (b) follow agreement reporting standards or schedules, (c) include in its voluntary agreement any terms specified by the state, (d) meet data collection, maintenance, or reporting requirements, and (e) incur penalties for not developing a voluntary agreement according to state guidelines.”¹⁰

The challenges faced in the Reduction Initiative should be taken into consideration when designing future emissions reduction programs.

No Industry-Specific Goals

It is difficult to plan projects and to quantify results without clearly defined and measurable goals. Either sector- or facility-specific reduction goals are needed to hold the mercury sources accountable for their emissions and to encourage reductions. Electric utilities and taconite processors represent an increasingly large percentage of total Minnesota Mercury Inventory as other sectors take action to reduce emissions. Specific, quantifiable goals are helpful because they provide industries with targets for making reduction decisions.

The MPCA agrees. “Based on program results to date and the results of other voluntary agreement programs in Europe and Canada, specific, measurable targets are a prerequisite to a successful nonregulatory effort.”¹¹

Furthermore, a lack of uniform reporting standards makes it difficult to quantify any reductions that may have been achieved.



Lack of Focus on Direct Mercury Air Emissions Reductions

Mercury has to enter water in order to contaminate fish. The MPCA has estimated that air emissions are responsible for 98-99 percent of mercury in surface waters; therefore air emissions need to be reduced in order to reduce fish contamination. Much of the effort to reduce mercury to date has focused on reducing mercury in products. According to the MPCA, only an estimated average of 15 percent of mercury contained in products make it to the atmosphere in the first year of disposal.¹² In contrast, 100 percent of mercury air emissions make it to the atmosphere. Pollution control equipment

can capture mercury, which is then landfilled. When disposed of properly, mercury is not likely to contribute to fish contamination.

The industries submitting voluntary agreements did take some action on the mercury issue. Some conducted studies of their facilities to understand where mercury was used or emitted. Many replaced equipment and instruments that contained mercury with products that did not. Some participants made significant contributions toward removing mercury products from their communities – through mercury thermometer collections, for example. These efforts

are commendable. However, there is no reason to believe that mercury existing in these products would ever have been improperly released into the environment. Potential reductions from collection programs cannot be compared to the benefits of reducing direct mercury air emissions on a daily basis.

Table 1: Direct Mercury Air Emissions Reductions¹³

	Direct Air Emissions Reduced (pounds per year)
Xcel Energy	up to 35
Western Lake Superior Sanitary District	~10
Minnesota Power	up to 57
North Star Steel	2
Metropolitan Council Environmental Services	78
Pounds reduced	up to 182

** Note that the Toxic Release Inventory (Appendix II) shows electric utility mercury air emissions increasing in the 2000-2002 period.*

Table 1 is the League's analysis of the mercury air emissions that were reduced as a result of the Reduction Initiative, based on the progress reports submitted by the participating industries. These are self-reported emissions reductions by industry and have not been independently verified.

The two largest sources of direct mercury air emissions in Minnesota are the electric utility industry and the taconite industry. The taconite industry accounts for 21 percent and the electric utility industry accounts for 42 percent of the 2000 Minnesota Mercury Inventory.

Taconite Industry

Although members of the taconite industry submitted voluntary agreements, no mercury emissions reductions have likely resulted except in the case of facility closures. Facility closures are not the outcome sought by the League.

Electric Utility Industry

Of the approximately 1,545 pounds of mercury air emissions emitted from coal-burning power plants annually, just over 6 percent – approximately 92 pounds – has been eliminated through the Reduction Initiative. These reductions have come from two actions.

Minnesota Power committed to include coal mercury content as a consideration when making coal-purchasing decisions, since coals can have varying mercury content. Beginning in 2000, Minnesota Power increased its amount of lower mercury coal purchases and achieved a reduction of approximately 57 pounds from 1990 levels. It is unclear whether or not these reductions are ongoing.

Xcel Energy completed the conversion of its Black Dog plant from coal to natural gas, which resulted in a reduction of up to 35 pounds per year beginning in mid-2002.

Other Industries

Metropolitan Council Environmental Services (MCES) is expecting to reduce direct mercury air emissions by 78 pounds per year beginning this year. MCES is installing a new air pollution control system for their incinerators. The Western Lake Superior Sanitary District discontinued their sludge incineration process and decreased their air emissions 100 percent. North Star Steel reported in 2001 that they undertook roof repairs to reduce fugitive mercury emissions by two pounds per year.

The League is most concerned about direct mercury air emissions from smokestacks because these are the type of mercury emissions that are most likely to result in fish contamination. Our analysis demonstrates that only about five percent of these most harmful emissions were reduced through the Reduction Initiative.

Approach Is Not Viable for the Future

According to the MPCA, more than 3,600 pounds of toxic mercury continue to be emitted in Minnesota each year.¹⁴ The single-largest source of mercury emissions in Minnesota is Xcel Energy's Sherburne County (Sherco) power plant. Emitting 886 pounds of mercury air emissions in 2000, Sherco not only tops the list of mercury emitters, but also contributes well over three times as much mercury as the second largest polluter in the state, which is Minnesota Power's Clay Boswell Energy Center.

Sherco accounts for approximately 25 percent of the total mercury emissions in Minnesota. The Sherco plant is very large, with a power production capability of 2,254 megawatts. Every day, 30,000 tons of coal – equivalent to three 100-car trainloads of coal – are burned in Sherco's three boilers.¹⁵ Although significant efforts have been made to control emissions of sulfur oxides, nitrogen oxides, and particulate matter, further controls are needed to reduce the largest source of mercury pollution in the state.

Sherco is the largest, but it is not the only large source in Minnesota. The extent of the mercury pollution problem is best understood by looking at the largest emitters in the state.

The taconite industry is currently enjoying a resurgence. As more facilities become operational, mercury air emissions from this sector will increase. Technologically and economically feasible

Table 2: Top 10 Mercury Emitters in Minnesota

Facility	MPCA 2000 Minnesota Mercury Inventory ¹⁶
Xcel Energy Sherburne County Generating Plant, Becker	886 lbs
Boswell Energy Center, Cohasset	263 lbs
Hibbing Taconite Company, Mesabi Range	225 lbs
North Star Steel, St. Paul	176 lbs
U.S. Steel (Minntac), Mesabi Range	171 lbs
National Steel Pellet Company, Mesabi Range	121 lbs
EVTAC Mining, Mesabi Range	106 lbs
Xcel Energy Riverside Generating Plant, Minneapolis*	98 lbs
LTV Mining, Mesabi Range**	83 lbs
Xcel Energy King Generating Plant, Bayport*	67 lbs

*Mercury emissions will be reduced 20% at King and 100% at Riverside through Xcel Energy's Metro Emissions Reduction Program.

** This facility is no longer operating.

emission control equipment has not been developed to control mercury emissions from taconite processing. The industry has participated in limited research to develop such mercury emissions controls. Minnesota should support further research in this area.

Demand for energy is also expected to increase in the future. As demand rises, it is likely that coal combustion will increase. Either more coal-burning power plants will be built, or existing coal plants will increase their capacity. Minnesota mercury levels from this sector will rise in the future unless control technologies are employed. Clearly, a great deal of work remains to control the mercury pollution problem and make Minnesota's fish safe to consume again.

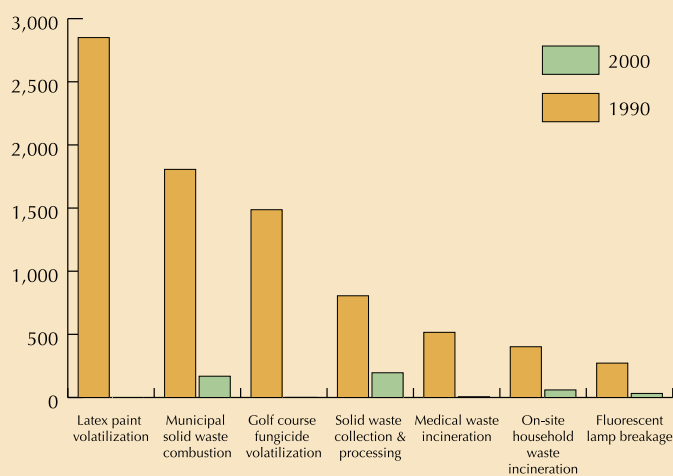
Conclusions from the League's Analysis

Since the voluntary agreements were first submitted in 2000, they have led to a reduction of direct mercury air emissions of less than five percent.¹⁷ It is clear that the voluntary agreements did not result in significant direct mercury air emissions reductions.

Future reductions of mercury air emissions will be necessary. The Izaak Walton League recommends that Minnesota policy-makers take the lessons learned from the Reduction Initiative into consideration. In future mercury emission reduction efforts, policy-makers should focus on reductions of direct air emissions, which are the emissions of greatest concern with regard to fish consumption. Moreover, future policy should include industry-specific goals and should require firm and uniform reporting standards.

Majority of Mercury Reductions Occurred Before the MCRI

From 1990 to 2000, air emissions of mercury in Minnesota declined by 68 percent, exceeding the 2000 goal set by the 1999 legislation.¹⁸ While it appears that the Reduction Initiative has been very successful in surpassing their goal, the real story is more complicated. Because of a shift in the 1990 baseline, the percent decline in mercury emissions between 1990 and 2000 is much greater than originally estimated. In addition, nearly all the reductions that have occurred are due to state and federal actions in the 1990s (for state actions, see Appendix III). Most of the reductions relate to the intentional use of mercury or management of mercury-containing products.



Federal bans in the early 1990s on mercury used as a fungicide in paint and used in snow mold control resulted in a 38 percent mercury reduction. A combination of Minnesota's 1995 waste combustor standards for municipal and medical waste incinerators and previous voluntary efforts in that sector led to another 19 percent reduction.¹⁹

Additional Minnesota legislation passed in the early 1990s banned the use of mercury in certain products, prohibited the disposal of mercury in solid waste, and required the management and recycling of lamps and other items. These actions led to more reductions in mercury releases to the environment.

These reductions that occurred before the Reduction Initiative was implemented and that occurred as a result of federal and state regulation are good, but should not be attributed to the success of the MCRI. In fact, using the revised baseline, it is likely that Reduction Initiative met its own goals prior to the legislation even taking effect.



Federal Action to Reduce Mercury

Although Minnesota sources produce over 3,600 pounds of mercury per year, not all of that mercury is deposited directly into Minnesota waters. Air pollution does not respect political boundaries such as state lines. MPCA estimates that only about 10 percent of the mercury deposition to Minnesota waters comes from Minnesota sources. The vast majority of our mercury emissions are transported out of state to contaminate the waters in neighboring states.

Some interests may argue that because so much mercury in Minnesota's water comes from out of the state, strict controls on sources within Minnesota are unwarranted. The Izaak Walton League disagrees. Minnesota needs to lead the effort to show others, both regionally and globally, that effective mercury control is feasible. Given the complex nature of the mercury contamination problem, Minnesota needs to advocate for a strong federal solution.

In December 2000, the U.S. EPA found that it is "appropriate and necessary" to regulate coal- and oil-fired electric utilities using maximum achievable control technologies (MACT) as required by the Clean Air Act. In January 2004, EPA proposed three alternatives for controlling air toxics, including mercury, emitted from power plants:

- 1) Require power plants to meet emissions limits consistent with MACT;
- 2) Create a market-based cap-and-trade program; or,
- 3) Create a cap-and-trade program that is federally run.

EPA asserts it will finalize a rule to control air toxics, including mercury, from power plants by March 15, 2005.

EPA is charged with regulating hazardous air pollutant (HAP) emissions from all industries, including the utility industry. These HAPs include many compounds that cause multiple and extreme adverse health effects in humans. Among them are mercury compounds, known human neurotoxins listed since 1971 by EPA and since 1990 by Congress as a HAP requiring maximum control. But EPA's proposal does not satisfy this requirement; indeed, its third alternative treats mercury as though it were a conventional air pollutant.

Minnesota needs to lead the effort to show others, both regionally and globally, that effective mercury control is feasible.

The League is troubled that EPA's proposals are all much weaker than what the Clean Air Act requires and what is known already to be achievable and cost-effective in this industry. Most notably, the proposal is weaker than reduction levels the EPA itself has previously suggested.

Assuming 90 percent of the mercury deposited into Minnesota comes from sources outside of the state, the League also recommends that Minnesota officials argue much more vocally and publicly that the proposed rule pending before EPA needs to be strengthened.

The MPCA took the first step, commenting to EPA in June 2004 that the proposed rule, "will not likely result in significant mercury reductions from power plants in and upwind of Minnesota."²⁰

The MPCA argues that Minnesota needs a stronger federal rule to attain mercury water quality standards that cannot be achieved by reduction of state emissions alone. It also recommends

Metro Area Reductions Project

Xcel Energy will reduce emissions from three coal-burning power plants in the Twin Cities metropolitan area through its Metro Emissions Reduction Project (MERP). The Emissions Reduction Rider statute, passed in 2001, afforded Xcel Energy this opportunity. Xcel Energy and the Izaak Walton League of America signed an agreement in which Xcel committed to proposing an emissions reduction project in 2001.

"The opportunities offered by the Emissions Reduction Statute spurred us to propose initiatives that balance the interests of the environment, our customers, and future energy supply needs in the region."

*- Judy M Poferl, director of Xcel Energy's
Regulatory Administration,
in a letter to the Minnesota Public Utilities
Commission, May 3, 2002.*

Xcel filed a petition for approval with the MPUC in May 2002 and it was approved in December 2003. The High Bridge power plant in St. Paul and the Riverside power plant in Minneapolis will be converted to natural gas. Xcel expects a 100 percent reduction in mercury emissions from both the Riverside and High Bridge plants. State-of-the-art emissions control equipment will be installed at the Allen S. King power plant in Oak Park Heights. Xcel Energy expects a 20 percent reduction in mercury emissions at the King plant. All three projects are scheduled to be completed by 2009 and will result in approximately 170 pounds of mercury reduced per year.

that the agency set more aggressive timelines by which emissions reductions must be achieved. Taking more aggressive steps to control mercury emissions is likely to result in rapid technological development that would not only benefit us by reducing emissions in the United States, but also by assisting to reduce emissions in the global community.

The League recommends that Minnesota policy-makers ask EPA to:

- Finalize a MACT standard that meets the requirements of the Clean Air Act and, through that standard, require a 90 percent reduction of electric utility mercury emissions by 2008.
- Reject the alternative performance standard approaches and the associated mercury trading proposals. These alternatives would cause additional mercury-related health risks through the promotion of pollution trading and would allow unacceptable amounts of mercury pollution to continue.

Other State Opportunities

Recognizing that the electric utilities have had little incentive to voluntarily reduce their emissions, the Minnesota Legislature passed Minnesota Statute §216B.1692, the "Emissions Reduction Rider," in 2001. This legislation creates an incentive for utilities to reduce emissions by allowing for the recovery of costs of qualifying emissions reductions projects without the need for a general rate case. This eliminates the regulatory lag (the time between expenditures for emission control equipment and recovery of those costs from customers in rates) and makes it possible for utilities to take on large reduction projects. For approval of an emissions reduction rider, a utility must submit a plan, which both the MPCA and Minnesota Public Utilities Commission (MPUC) must review for environmental and economic appropriateness. All investor-owned utilities



Photo: Chicago Wilderness

in Minnesota are currently eligible to apply for the emission reduction rider, which expires on June 30, 2006.

The Izaak Walton League supports extending and further utilizing the Emissions Reduction Rider to encourage additional emission reduction projects. Similar incentives should also be made available to municipal utilities and electric cooperatives.

Technology to Get the Job Done

Some contend that the technology to reduce mercury from coal-fired electric utilities is not available at this time. In fact, the opposite is true. There are several approaches to controlling mercury emissions available today, some even employed by Minnesota utilities. Options include:

- Coal cleaning as a pre-combustion alternative;
- Installing conventional controls;
- Optimizing the mercury capture of existing control devices for other pollutants;
- Adding mercury-specific controls; and,
- Multipollutant approaches (e.g. strategies to simultaneously reduce mercury, nitrogen oxides, sulfur oxides, and particulate matter pollution).

Other State Legislation

Massachusetts

Although the state's four coal-fired power plants already capture an average of 67 percent of the mercury in the coal burned at their facilities, the Massachusetts state government adopted new regulations in 2004 to further reduce the amount of mercury emitted. By January 1, 2008, each power plant must capture at least 85 percent of the mercury. The percentage of mercury that must be captured increases to 95 percent by October 1, 2012.²⁵ This will lead to annual mercury emission reductions of about 155 pounds.²⁶ The Massachusetts Department of Environmental Quality estimates that if facilities pass the capital and operating costs of mercury controls on to consumers, a typical household would pay an additional \$0.09 to \$0.81 per year.²⁷

Wisconsin

This year Wisconsin has done what no other state in the Midwest has done – passed a statute requiring cuts in mercury pollution from coal-burning power plants. Other states, such as Connecticut, Massachusetts, and New Hampshire, have also recently passed mercury control legislation. But while Eastern states generally burn bituminous coal, Wisconsin and many Midwestern states (including Minnesota) burn mostly subbituminous coal. It is more difficult to remove mercury from subbituminous coal than bituminous. But Wisconsin believes subbituminous coal can be burned cleaner, and needs to be burned cleaner, to protect Wisconsin's waters.

Wisconsin's rule requires major utilities to reduce their baseline mercury emissions 40 percent by 2010, and by 75 percent by 2015.

²⁸ Although some feel that the rule is not strong enough, it will help drive the development of mercury control technology for subbituminous coal plants.

When the federal mercury rule is finalized, Wisconsin's mercury legislation requires that the state rule cannot be stricter than the federal standard. Although the federal rule may be held up in litigation, Wisconsin's power plants will be reducing their mercury emissions and setting an example for other states.

Mercury Controls On New Power Plants

Xcel Energy has recently proposed to add a 750-megawatt boiler that will burn subbituminous coal to its existing Comanche plant near Pueblo, Colorado. Construction plans include numerous environmental controls, including technology to reduce mercury emissions:

“Public Service believes that it can comply [with mercury limits] by using the proposed baghouse in combination with activated carbon injection technology or other non-carbon based sorbent technologies. The use of other commercially available mercury sorbent technologies is also being considered for Comanche 3.”

- Olon Plunk, Direct Testimony, *In the Matter of the Application of Public Service Company of Colorado for a Certificate of Public Convenience and Necessity for the Comanche Unit 3 Generating Facility*
April 3, 2004

MidAmerican Energy received a permit from the Iowa Department of Natural Resources (IDNR) in 2003 to construct a new 190-megawatt generating unit in Council Bluffs, Iowa, which will also burn subbituminous coal. The unit will likely begin operation in 2008. The IDNR has determined that an activated carbon injection system can achieve at least 83 percent mercury control.

These new construction plans demonstrate that utilities believe effective mercury control is achievable.

Regulation can drive technological advancements. According to the Northeast States for Coordinated Air Use Management, control technology innovation has occurred only after environmental regulations have been put into place. In addition, using the history of nitrogen oxides and sulfur oxides regulation as examples, estimates of compliance costs prior to regulation are often well above actual compliance costs. Further, looking at the success of waste combustors, it is clear that dramatic mercury reductions can be achieved through regulatory requirements.²¹

Technologies designed to specifically capture mercury, or that offer multipollutant benefits, are in various stages of development ranging from bench-scale testing to commercially available. We believe that regulation is likely to further spur the development of these technologies and help create new markets for control technology vendors.

Several states have already pursued and passed mercury reduction legislation for electric utilities, including Wisconsin, Connecticut, Massachusetts, New Hampshire, and New Jersey. Their regulations are much stricter than EPA's proposed rule. Unlike power plants in Eastern states, which burn bituminous coal, Minnesota power plants overwhelmingly burn subbituminous coal. It can be easier to remove mercury from bituminous coal compared to subbituminous coal. However, much of the legislation from other states relies on the development and availability of technology to reduce mercury.

A survey of some mercury capture technologies and their capture efficiency is presented in Table 3.

Table 3. Mercury-Specific or Multipollutant Control Technologies^{22 23 24}

Mercury Control Approach	Percent Mercury Capture	Comments
Conventional coal cleaning	23%	Average removal for eastern bituminous coals.
Optimization of existing controls	Variable	Incremental increase in performance.
Installation of conventional controls	29%	National reduction achievable through implementation of proposed Clean Air Interstate Rule.
Activated carbon injection with an electrostatic precipitator for particulate matter control	60%	Addition of a small fabric filter would increase the capture efficiency to 90%. Saving in sorbent costs would pay back the cost of the fabric filter in three to four years.
Activated carbon injection with existing fabric filter for particulate matter control	90%	For subbituminous and lignite coals, an activated carbon that is treated with iodide, sulfur, or bromine would probably be needed to achieve this high level of reduction.
COHPAC-TOXECON™	90%	This configuration is a small fabric filter in combination with activated carbon injection. High capture efficiency for all coal types.
Enhanced wet scrubbing	50% – 80%	Control efficiencies vary with scrubber chemistry. Avoids excess carbon in the fly ash.
K-Fuel®	70%	Advanced coal cleaning techniques for subbituminous coals.
Powerspan – ECO®	80% – 90%	Multipollutant control. Also removes 98% of sulfur dioxide, 90% of nitrogen oxides, and 99.5% of fine particulate matter (PM _{2.5}).
Advanced Hybrid Filter™	>90%	Used in conjunction with activated carbon injection.
Airborne Process	Up to 75%	Multipollutant control. Also removes >95% of sulfur dioxide, 60 to 79% of nitrogen oxides.
LoTox™ Process	> 90%	Multipollutant control. Also removes >90% of nitrogen oxides.
MerCAP™ (Mercury Control via Adsorption Process)	> 80%	This places fixed structures into a flue gas stream to absorb mercury.

Recommendations and Conclusions

The League is concerned because mercury contamination of fish has an adverse effect on our health, our economy, and our fishing traditions in Minnesota. Mercury poses serious health risks to the developing fetus and to young children. Mercury contamination threatens the resource on which sport fishing depends and has real economic consequences for League members and the whole of Minnesota.

The League believes that market mechanisms and voluntary efforts can result in successful outcomes. However, the disappointing results of the Reduction Initiative demonstrate that significant results do not occur without clear goals and regulatory requirements. We applaud all mercury reductions. The League remains concerned, however, that the Reduction Initiative did not result in significant reductions of direct mercury air emissions. After reviewing the available data, we must conclude that the Reduction Initiative did not succeed.

Minnesota has been a leader for decades in air pollution reduction, beginning with our efforts to address acid rain in the 1970s. Minnesota needs to, and can, show other states how to reduce mercury emissions while maintaining a strong business economy.

The League stands ready to work with responsible businesses and government agencies to find more successful means of addressing our mercury pollution problem.



The technology to solve the mercury problem can be further developed with the proper incentives and regulations at the state and federal levels. New markets will open as a result of employing technologies to curb mercury emissions.

The League stands ready to work with responsible businesses and government agencies to find more successful means of addressing our mercury pollution problem.

The Izaak Walton League recommends the following actions:

- Strengthen the pending federal mercury rule before it is finalized next year;
- Extend the state's Emissions Reduction Rider;
- Provide authority to state agencies to require sector-specific or facility-specific mercury reductions;
- Increase funding for research and development of taconite mercury controls; and,
- In the absence of a strong federal mercury rule, pass state legislation that requires mercury reductions in Minnesota.

Appendix I: Mercury Contamination Reduction Initiative's Advisory Council

Member	Main Alternate	Representing
Peter Bachman	Bob Eleff	Minnesota Center for Environmental Advocacy
Alexis Cain	Frank Anscombe	US EPA Region 5
Richard Diercks	Susan Lightfoot	Minnesota Dental Association
John Dwyer	Clifford Porter	Lignite Energy Council
David Festa	Stacey Davis	Center for Clean Air Policy
Rebecca Flood	Leo Hermes	Metropolitan Council
Dr. Daniel Foley, Chair	David Thornton	Minnesota Pollution Control Agency
Brian Golob	Jan Nisiewicz	Recyclights
Pam Graika	Lee Eberley	Northern States Power
Bill Grant	Amy Fredregill	Izaak Walton League of America
J. Drake Hamilton	Michael Noble	Minnesotans for an Energy-Efficient Economy
Ann Glumac Dave Skolasinski	Stephani Campbell Scott Hautala	Minnesota Iron Mining Association (Campbell is with MnTAC)
Diane Jensen	Marie Zellar	Clean Water Action/The Minnesota Project
Dave Jeronimus	Tim Hagley	Minnesota Power
Kathy Svanda	Pat Bloomgren	Minnesota Department of Health
Will Kaul	Karen Utt	Cooperative Power
Steve Keefe		Honeywell, Inc
Rich Korman Scott Grosscup		Minnesota Hospital and Healthcare Partnership
Gail Lewellan	Jack Skrypek	Minnesota Department of Natural Resources
Carl Michaud	Dave Wierens	Association of Minnesota Counties
Sherry Munyon Rolf Hanson		Minnesota Chamber of Commerce
Trudy Richter	Rob Dunnette	Minnesota Resource Recovery Association
Michael Robertson		Minnesota Forest Industries
Larry Schwarzkopf	Fred Vande Vetter	Fond du Lac Indian Reservation
Tim Tuominen		Western Lake Superior Sanitary District
Rosemary Wilson	John Knapp, Molly Sigel	Center for Energy and Economic Development

Appendix II: Toxic Release Inventory: Summary of Minnesota Electric Utilities²⁹

Facility Name	Mercury Releases (lbs)		
	2000	2001	2002
Northeast Power Station, Austin Public Utilities	7	8	7
Hibbing PUC	6	6	6
Boswell Energy Center, Minnesota Power	263	286	297
Laskin Energy Center, Minnesota Power	20	19	19
Taconite Harbor Energy Center, Minnesota Power	NA	NA	46
Minnesota Power subtotal:	283	305	362
Hoot Lake, Otter Tail Power Company	37	31	32
Silver Lake, Rochester Public Utilities	5	2	NA
Allen S. King, Xcel Energy	68	64	70
Black Dog, Xcel Energy	50	36	48
High Bridge, Xcel Energy	66	71	67
Sherco, Xcel Energy	884	843	876
Riverside, Xcel Energy	98	92	104
Xcel Energy subtotal:	1,166	1,106	1,165
Electric Utility Totals:	1,504	1,458	1,572

Appendix III: Summary of Mercury Reduction Strategies Employed in Minnesota Since 1990.

Voluntary Programs	
Household/Small Business Hazardous Waste Collection 1990s-present	Many county-run programs that accept mercury-containing items from homeowners and businesses.
Health Care Outreach 1994-present	Education to encourage management and reduction of mercury-containing equipment.
Dental Office Outreach Late 1990s-present	Municipal wastewater-treatment plants and the Minnesota Dental Association conducted outreach, established best management practices and set goals for 100% participation.
Voluntary Reduction Agreements 1999/2000 –2005	Large emitters enter into voluntary agreements to reduce emissions.
Mercury Switches in Automobiles 2000, 2004	Major MN steel recycler offers bounty of \$40/lb of bare switches offered (2000). Program operated by MN Waste Wise and funded by auto manufacturers provides free collection, transportation and recycling for auto switch assemblies (2004).
Mercury-Free Zone Program 2001-present	Schools pledge to become and stay mercury free and receive an assessment, curriculum, video and often educational visit by the MPCA's mercury educator, Carol Hubbard, and Clancy, its mercury-detecting dog.
Regulatory Programs	
Waste Combustor Standards 1993-1995	Sets air emission limits on mercury and requires mercury-reduction plans for municipal and medical waste incinerators.
Water Discharge Standards 2001	Wastewater dischargers are required to monitor for mercury using EPA Method 1631; mercury effluent limits are set in some cases.
State Laws	
Commercial-Use Battery Manufacturer Responsibility 1990	Requires manufacturers to take back non-household use batteries that are hazardous when discarded, including mercuric oxide and silver oxide batteries.
Battery Mercury Reduction 1990, amended in 1991-1993	Law bans mercuric oxide batteries and the addition of mercury to alkaline batteries. Establishes a 25-mg limit in button batteries.
Toxics in Packaging 1991	Prohibits the intentional introduction of mercury (and 3 other metals) into packaging.

Toxics in Products/ Listed Metals in Specified Products 1991 with later amendments	Prohibits the sale of inks, pigments, paints, dyes and fungicides containing mercury (and three other metals) unless exempted. No mercury exemptions were granted.
Thermostat Take-back 1992-present	Requires thermostat manufacturers to provide education and incentives for thermostat recovery and recycling. Through a reverse distribution system involving contractors and wholesalers, manufacturers take back out-of-service units.
Major Appliance Components 1992	Requires removal and recycling of mercury-containing components in major appliances, including components removed by service and repair companies.
Mercury in Construction/ Demolition 1992	Prohibits disposal, implying removal before demolition. Education and enforcement conducted.
Mercury Product Labeling Enforcement 1992	Requires labeling of most mercury-containing products. MPCA enforcement actions related to labeling resulted in withdrawal of several products from the Minnesota market and in some cases spurred manufacturers to completely discontinue their manufacture and sale.
Mercury-containing Product Sales Bans 1992, 1994, 2001	Toys, games (1992), apparel (1994) and thermometers (2001) that contain mercury may not be sold in Minnesota.
Fluorescent Lamp, Other Product Disposal Ban 1993/1994	Requires businesses and households to recycle fluorescent lamps, stimulating development of recycling infrastructure.
Auto Switch Removal 1996	Requires “good faith effort” to remove mercury switches prior to crushing.
Dairy Manometer Ban and Buy-back 1997	Bans the sale, installation, repair, and use (after 12/31/2000) of mercury-containing manometers, establishes \$100 incentive for turning in old gauge.
Relay Manufacturer Responsibility 1997	Requires manufacturers of mercury displacement relays to provide education and incentives, and cover costs of managing out-of-service units.
Mercury Reduction Law 1999	Requires the State of Minnesota to pursue Advisory Council-recommended strategies, establishes a goal of 70% reduction in emissions by 2005 based on 1990 levels. Final report due in 2005.

Endnotes

- ¹ American Sportfishing Association, 2001. "Sportfishing in America: Values of Our Traditional Pastime," page 9. Based on a ten percent update for 2001 inflation.
- ² Minnesota Pollution Control Agency, 1999. Report on the Mercury Contamination Reduction Initiative: Advisory Council's Results and Recommendations.
- ³ Minnesota Pollution Control Agency, 2004. Estimated Mercury Emissions in Minnesota for 1990, 1995 and 2000: March 2004 Update. <http://www.pca.state.mn.us/publications/reports/mercury-emissionsreport-0304.pdf>.
- ⁴ U.S. Environmental Protection Agency, 1997a. Mercury Study Report to Congress, Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States. EPA-452/R-97-004.
- ⁵ Minnesota Department of Health, Fish Consumption Advice. <http://www.health.state.mn.us/divs/eh/fish/index.html>.
- ⁶ Mahaffey, K., U.S. Environmental Protection Agency, 2004. Presentation at National Forum on Fish Contaminants, <http://www.epa.gov/waterscience/fish/forum/2004/presentations/monday/mahaffey.pdf>.
- ⁷ Minnesota Pollution Control Agency, 1999. Report on the Mercury Contamination Reduction Initiative Advisory Council's Results and Recommendations. www.pca.state.mn.us/mercury.
- ⁸ Minnesota Pollution Control Agency, 2004. Estimated Mercury Emissions in Minnesota for 1990, 1995 and 2000: March 2004 Update. <http://www.pca.state.mn.us/publications/reports/mercury-emissionsreport-0304.pdf>.
- ⁹ Minnesota Pollution Control Agency, 1999. Report on the Mercury Contamination Reduction Initiative: Advisory Council's Results and Recommendations.
- ¹⁰ Minnesota Pollution Control Agency, 2002. "Evaluating Voluntary Agreements" from Mercury Reduction Program Progress to the Minnesota Legislature.
- ¹¹ Minnesota Pollution Control Agency, 2002. Mercury Reduction Program Progress Report to the Minnesota Legislature.
- ¹² Minnesota Pollution Control Agency, 1999. Report on the Mercury Contamination Reduction Initiative Advisory Council's Results and Recommendations
- ¹³ Data from progress reports submitted to the Minnesota Pollution Control Agency by voluntary agreement participants, www.pca.state.mn.us/air/mercury.html.
- ¹⁴ Minnesota Pollution Control Agency, 2004. Estimated Mercury Emissions in Minnesota for 1990, 1995 and 2000.
- ¹⁵ Xcel Energy 2004. Sherburne County (Sherco) Plant. http://www.xcelenergy.com/XLWEB/CDA/0,get%20this,1-1-1_1875_4797_4014-3642-0_0_0-0,00.html
- ¹⁶ Minnesota Pollution Control Agency, 2004. Estimated Mercury Emissions in Minnesota for 1990, 1995 and 2000.
- ¹⁷ This figure is calculated by adding the direct emissions indicated from progress reports from Xcel Energy (35 lbs/yr), Minnesota Power (57 lbs/yr), North Star Steel (2 lbs/yr), MCES (78 lbs/yr) and WLSSD (10 lbs/yr), divided by 3,638 (2000 total estimate).
- ¹⁸ Minnesota Pollution Control Agency, 2004. Estimated Mercury Emissions in Minnesota from 1990, 1995, and 2000: March 2004 Update.
- ¹⁹ Minnesota Pollution Control Agency, personal communication, 2004.
- ²⁰ Comments of Commissioner Corrigan, Minnesota Pollution Control Agency, June 2, 2004. EPA Air Docket ID No. OAR-2002-0056 (Proposed National Emission Standards for Hazardous Air Pollutants, and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units).

- ²¹ NESCAUM, 2003. Mercury emissions from coal-fired power plants: The case for regulatory action.
- ²² NESCAUM, 2003. Mercury emissions from coal-fired power plants: The case for regulatory action.
- ²³ U.S. Environmental Protection Agency, 2003. Performance and cost of mercury and multipollutant emission control technology applications on electric utility boilers. Prepared for Office of Research and Development. EPA-600/R-03-110.
- ²⁴ M.J. Bradley and Associates, 2004. *Environmental Energy Insights*. Volume VII, Issue 1.
- ²⁵ Massachusetts Final regulatory revisions to 310 CMR 7.29 at <http://www.mass.gov/dep/bwp/daqc/files/regs/hgreg.pdf>.
- ²⁶ Massachusetts Department of Environmental Protection, 2004. Fact Sheet: Mercury Emission Limits for Coal-fired Power Plants at <http://www.mass.gov/dep/bwp/daqc/files/regs/hgfact.pdf>.
- ²⁷ Commonwealth of Massachusetts Executive Office of Environmental Affairs, Department of Environmental Protection, Bureau of Waste Prevention Division of Planning and Evaluation, May 2004. Response to Comments for Proposed Amendments to 310 CMR 7.00 et seq.: 310 CMR 7.29 – Emission Standards for Power Plants at <http://www.mass.gov/dep/bwp/daqc/files/regs/hgrtc.pdf>.
- ²⁸ Wisconsin Natural Resources Board, 2004. Authorizing Statutes ss. 227.11(2) (a) and 285.11 (9). <http://dnr.wi.gov/org/aw/air/reg/mercury/AM-27-01signed.pdf>.
- ²⁹ All data are from <http://www.epa.gov/triexplorer/>. Electric utilities began reporting mercury to the TRI after the threshold for reporting mercury was lowered in 2000. Taconite facilities are not required to report mercury emissions to the TRI.



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