

Appendix C

Minnesota Strategies to Reduce Mercury Emissions

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Since the early 1990s, Minnesota has been a national leader in reducing mercury releases to the air, water and land, especially from product-related sources. The state employs an array of voluntary, regulatory, legislative, incentive-based and educational tools that involve state agencies, local government, nongovernmental organizations, and businesses. In concert with similar initiatives on the federal level, Minnesota's efforts have contributed to a 70 percent decline in mercury emissions during the last 15 years. Table 1 summarizes a variety of voluntary, educational and regulatory initiatives employed in the state; several are described below.

In the 1990s, the Minnesota Legislature enacted ground-breaking laws banning mercury from products, banning mercury and mercury-product disposal in municipal waste streams, requiring the labeling of most mercury-containing products, and requiring proper management. For example, Minnesota was the first state to ban the sale of mercury-added alkaline batteries. Several years later, the federal government took the same action.

Minnesota was also the first state to ban the sale of mercury-containing pigments, dyes, paints, toys, games, apparel, manometers used in the dairy industry and all thermometers (not just fever thermometers). Minnesota was the first state to prohibit disposal of fluorescent tubes, the first state to require the removal of mercury switches from automobiles, and the first state to require manufacturer-based programs for thermostats and relay switches. Similar laws and regulations have since been enacted by many other states.

In addition to playing a supporting role in legislative actions to address mercury, the MPCA played an important role in pioneering programs and regulations addressing mercury products. The agency led a national effort to ensure that mercury lamps were not exempted from proper management. And, ours was the first state to adopt a framework subsequently adopted by the U.S. Environmental Protection Agency (the Universal Waste Rule) to facilitate management of mercury wastes.

Businesses in Minnesota also pioneered the recycling of mercury-containing products and fluorescent lamps. Many of the first recycling facilities for these products in the country were established in Minnesota. The thermostat industry's take-back program for mercury thermostats started as a collaborative pilot in Minnesota and is now a nationwide program.

The MPCA also adopted rules that set mercury standards for municipal and medical waste incinerators ahead of federal requirements. These rules call for stricter emissions limits than the current federal standard. The waste combustor standards, coupled with increased mercury product management and reduction, resulted in major emissions reductions.

Minnesota also has implemented notable outreach programs targeting the general public and key mercury use sectors, such as hospitals, dental clinics and schools. One unique effort is the MPCA's Mercury-Free Zone Program. By pledging to reduce mercury-containing equipment from science labs and health-care facilities, schools are eligible to receive a visit from Clancy,

the MPCA's mercury-detecting dog. Clancy is trained to detect mercury vapors, such as those from spills in a lab, which are subsequently removed.

Since 2001, the Mercury-Free Zone Program has removed more than 1,000 lbs. of elemental mercury from over 500 middle and high schools. Clancy has located several significant spills that had escaped detection by other means. In addition to reducing exposure to mercury vapors, Clancy has helped to educate more than 16,000 students and teachers about the dangers of mercury and he is the only dog used in this manner in the country.

In addition, two large wastewater-treatment plants in Minnesota have been national leaders in efforts to work with dentists to reduce the amount of mercury from dental amalgam entering the liquid waste system. The Western Lake Superior Sanitary District in Duluth and Metropolitan Council Environmental Services (MCES) in the Twin Cities have worked extensively with dental clinics in their service areas and statewide to adapt best management practices for dental amalgam.

In 1996, the MPCA initiated the Mercury Contamination Reduction Initiative aimed at reducing mercury contamination of fish in Minnesota lakes and rivers. As part of the initiative, the agency formed a stakeholder advisory council to develop recommendations on mercury-reduction strategies. The advisory council's recommendations were adopted by the Minnesota Legislature in 1999 and continue to form the basis of Minnesota's mercury-reduction program. These strategies include establishing reduction goals, national and international strategies, research, reducing use and voluntary agreements. The status of these strategies is summarized in Table 3-2.

The 1999 law established a voluntary mercury-reduction agreement program encouraging the largest emitters in the state to enter into agreements with the MPCA to voluntarily reduce their mercury air emissions. Participants in the program are expected to implement cost-effective, technologically feasible reduction measures. The MPCA agreed not to pursue additional state regulations, at least until 2005, as long as adequate progress is made in reducing emissions. To date, voluntary reduction agreement participants' actions have resulted in approximately 183 lbs. of annual emissions avoided. When fully implemented, reduction agreement actions initiated to date will result in additional reductions in annual emissions of an estimated 370 lbs. by 2009.

Table 3-1 Summary of mercury-reduction strategies used in Minnesota since 1990

Voluntary Programs	
Health Care Outreach	Education on identification, management and reduction of mercury-containing equipment and chemicals. 1996 and on-going.
Household/Small Business Hazardous Waste Collection	Many county-run programs that accept mercury-containing items from homeowners and small businesses. 1993 and on-going.
Dental Office Outreach	Municipal wastewater-treatment plants and the Minn. Dental Assoc. established best management practices and goals for 100% participation. 1993 and on-going.
Thermostat Takebacks	Through a reverse distribution system involving contractors and wholesalers, manufacturers take back out-of-service units. Law requires manufacturers to provide education and incentives. 1993 and on-going.
Mercury Switches in Automobiles	1995 law requires “good faith effort” to remove mercury switches before crushing by salvage yards; bounty of \$40/lb. of switches is offered by major steel recycler. Auto manufacturer-funded collection and recycling program initiated in 2004.
Mercury-Free Zone Program	Schools pledge to be mercury free and receive an assessment and educational visit by the MPCA’s mercury educator and its mercury-detecting dog. 2001 and on-going.
Voluntary Reduction Agreements	Large emitters enter into voluntary agreements to reduce emissions. 1999/2000 and ongoing.
Regulatory Programs	
Waste Combustor Standards	Sets air emission limits on mercury and requires mercury-reduction plans for municipal and medical waste incinerators. 1993-1995. Small, on-site incinerators banned.
Industrial Boiler MACT	MPCA implements federal industrial boiler and process heater standard imposing mercury-emission limits on new and existing solid-fuel boilers and major sources of hazardous air pollutants.
Water Discharge Standards	Wastewater dischargers are required to monitor for mercury using ultra-low detection limits (EPA Method 1631); mercury effluent limits are set in some cases.
Special Waste Pilot Project/Universal Waste Rule	Minnesota adopted streamlined regulatory framework to facilitate recycling of mercury-containing products, 1993. Preceded federal Universal Waste Rule promulgated in 1995 and expanded in 1999 and 2005.
State Laws	
Fluorescent Lamp, Other Product Disposal Ban	Requires businesses and households to recycle fluorescent lamps, stimulating development of recycling infrastructure. 1993-94.
Mercury-containing Product Sales Bans	Toys and games, apparel and thermometers that contain mercury may not be sold in Minnesota. 1992, 1994, 2001 respectively
Mercury Product Labeling	Requires labeling of most mercury –containing products to inform of the presence of mercury and need to manage properly. 1992
Dairy Manometer Ban and Buy-back	Bans the sale, installation and repair of mercury-containing manometers, establishes \$100 incentive for turning in old gauge. 1997-2000
Relay Manufacturer Responsibility	Requires manufacturers of mercury displacement relays to cover costs of managing out-of-service units. 1997
Battery Mercury Reduction	Bans mercuric oxide batteries and the addition of mercury to alkaline batteries. Establishes a 25-mg/0.025% limit in button batteries. 1993
Mercury in Construction and Demolition	Law prohibits disposal, implying removal prior to demolition. Education and enforcement are conducted. 1992
Mercury Reduction Law (1999)	Requires the state to pursue advisory-council-recommended strategies, establishes a goal of 70% reduction in emissions by 2005 based on 1990 levels. 1999

Table 3-2. Status of Strategies Recommended by Advisory Council in 1999

Strategy	Status
National Recommendations	
International Mercury Management Plan/ National Mercury Product Labeling/ National Mercury Research/ Lower Emissions Limits for Medical Waste Combustors	Since 1999, the MPCA has become increasingly involved in working with other states and the EPA to address mercury on a national level including addressing international mercury supplies, national product labeling surplus, national research and lowering site-specific waste combustor standards
Change Reporting Protocols for U.S. Toxics Release Inventory (TRI) for Mercury	Reporting threshold reduced from 10,000 lbs. to 10 lbs. in 2000. Utilities required to report for the first time.
Evaluate Feasibility of Lower Emission Limits from Sewage Sludge Incinerators	The MPCA has not participated in national activity on sewage sludge incinerators.
Establish a National Credit-for-Early-Action Program	The MPCA has offered support to the Center for Clean Air Policy's efforts.
Create a Mercury-Related Outreach Position for Minnesota	Various staff have played a role in encouraging national and international strategies
Minnesota Mercury Inventory, Research, Monitoring and Reporting	
Develop comprehensive release inventory	Minnesota's air emissions inventory is one of the most comprehensive of all states' and most releases to other media are quantified.
Conduct research on issues relevant or unique to Minnesota reductions	Minnesota research includes fish monitoring and studying the effects of sulfate deposition on mercury methylation.
Establish measurement, monitoring and reporting protocols	These are proposed to be established as part of the TMDL implementation
Reducing Purposeful Use	
Improve collection infrastructure/ Conduct "clean-sweeps"	MPCA has worked with regional household hazardous waste programs to collect mercury and conduct "clean sweeps." Most comprehensive efforts have taken place in the Lake Superior Basin.
Label products currently in use	Healthcare providers, voluntary reduction agreement participants and others have labeled mercury products in use.
Improve compliance with current laws/ Increase compliance with current disposal bans / Reduce mercury in buildings	Enforcement of product disposal bans occurs for lamps and in the demolition sector. Some enforcement of labeling laws.
State Avoids buying mercury-containing products	Vehicle, healthcare supplies and other procurement contracts contain disclosure/no mercury clauses.
Explore additional bans	Comprehensive mercury thermometer sales ban in 2001.
Educate users of mercury/ Educate dental offices	Various outreach programs including the Mercury-Free Zone, dental sector, healthcare and voluntary agreements.
Use mercury detecting dog	MPCA employs the only mercury-detecting dog in the country in the Mercury-Free Zone Program
Develop Voluntary Agreements	
Develop voluntary agreements	15 companies and organizations participating