Getting Serious About Mercury

A Guide for Developing Comprehensive Mercury Reduction Programs

Janelle St. Pierre
Sarah O'Brien
Michael Murray, Ph.D.

Project Director
Felice Stadler

May 2002

National Wildlife Federation gratefully acknowledges the support of the Garfield Foundation, which provided support for this report, as well as the Beldon Fund, the George Gund Foundation, and the John Merck Fund which support NWF's mercury work in the Great Lakes and New England Regions.

Without the dedicated efforts of NWF intern, Janelle St. Pierre, this report would not have been possible. In addition, several colleagues in state agencies and environmental organizations provided invaluable guidance and input, including:

Gregg Small, Washington Toxics Coalition
Randy Case, Wisconsin Department of Natural Resources
John Reindl, Dane County Department of Public Works, Wisconsin
Lara Sutherland, INFORM, Inc.
Laura Weiss, Oregon Environmental Council
Mark Smith, Massachusetts Department of Environmental Protection
Bill Grant and Sarah Welch, Izaak Walton League

NWF staff Shell Rumohr and Marci Brandenburg (Great Lakes Field Office) helped pull together critical information under a very tight deadline, and Andy Buchsbaum offered valuable insight and critique. The project director is particularly indebted to Michael Murray and Sarah O'Brien, who spent countless hours answering seemingly never-ending requests for additional copy, editing final drafts, all while maintaining good humor throughout this project.

Report design by Murdock Advertising and Design, LLC, Ann Arbor, Michigan.

This report is available on NWF's website at http://www.nwf.org/cleantherain.

The mission of the National Wildlife Federation is to educate, inspire and assist individuals and organizations of diverse cultures to conserve wildlife and other natural resources and to protect the earth's environment in order to achieve a peaceful, equitable and sustainable future.

Northeastern Field Office
National Wildlife Federation
58 State Street
Montpelier, VT 05602
802-229-0650 Voice
802-229-4532 Fax

Great Lakes Field Office
National Wildlife Federation
213 W. Liberty, Suite 200
Ann Arbor, MI 48104-1398
greatlakes@nwf.org
734-769-3351 Voice
734-769-1449 Fax

Contents

Preface

The damaging effects of mercury on wildlife and communities have become all too clear over the past decade. From its threats to the health of children to its damaging toll on fish, birds, and mammals, it has become apparent that mercury pollution is a danger we can no longer afford.

As with other persistent pollutants such as dioxins, eliminating the dangers of mercury will require addressing human releases of mercury through a combination of innovative technical approaches, creative tactics, and political willpower. Fortunately, many efforts are already underway, especially at the state and local levels. But few of these efforts incorporate all of the elements necessary to fully eliminate the threat; far more work is needed. That's where this guide comes in.

The National Wildlife Federation created this report as a roadmap to assist individuals, policy-makers, businesses and communities in developing, implementing and strengthening mercury reduction initiatives. Through a review of several state cases studies and other initiatives, we have identified elements that can help move a program in a positive direction. Additionally, this guide offers suggestions for overcoming the challenges that can undermine even the best initiatives.

As you read this guide, it will become clear that changes in behavior will be needed at every level—from governments to businesses to individuals—if we are to be successful in removing the threat of mercury pollution from our lives. It will be a daunting task, but one at which we can and must succeed. We hope that this guide will provide you with both the motivation and the ability to get involved. Please read it and take action! The health of people and wildlife alike depend on eliminating the threat of mercury pollution from our world.

To learn more about the National Wildlife Federation's efforts to combat mercury contamination and how you can get involved, visit our web site at www.nwf.org/cleantherain. Mercury is a serious threat to people and wildlife everywhere. But together, we can eliminate that threat.

Mark Van Putten
President and CEO
National Wildlife Federation

CHAPTER 1
Introduction

Purpose of Guidebook

Mercury is well-recognized as one of the most pervasive and pernicious environmental challenges in the nation. Its widespread public health effects have been well-documented by the National Academy of Sciences, the Centers for Disease Control and Prevention, and the U.S. Environmental Protection Agency. It has so contaminated the food chain that 41 states and the Food and Drug Administration have issued fish consumption advisories warning people to restrict or avoid consuming certain species of fish. Yet mercury has proven particularly difficult to remove from the environment. Because it is released from so many different products and processes in several forms, traditional pollution control approaches cannot adequately protect people and wildlife. Creative, innovative, and systematic efforts are needed to address the mercury problem.

This guide is intended to be a resource for those interested in making those efforts. It is designed as a tool for policy makers and activists on local, state and federal levels interested in ramping-up existing mercury reduction initiatives or designing more comprehensive programs. The ultimate goal of a comprehensive program is to eliminate the use and release of mercury in consumer and commercial settings. Accomplishing this task requires a focused and committed effort to target mercury pollution at the source of the problem rather than at the smokestack, landfill, or wastewater pipe.

Eliminating mercury requires a focused and committed effort to target mercury pollution at the source of the problem rather than at the smokestack, landfill, or wastewater pipe.

Until recently, the majority of pollution prevention activities on the local level have been piecemeal in nature—an educational effort here, a collection program there, etc. However, recognizing the need for a broader commitment toward phasing out persistent toxic chemicals like mercury, there is a growing trend toward developing comprehensive programs on the local and state level. To further this change, the National Wildlife Federation (NWF) has developed this report on current successful programs and strategies. It includes an analysis of a handful of promising mercury pollution prevention initiatives, coupled with insights into the challenges of implementing programs and criteria for determining program success. While this guide focuses primarily on product use and waste reduction, the lessons learned, conclusions drawn, and recommendations presented are applicable to programs that target all sources of mercury.

The guide consists of seven sections: background, legal requirements, state program overview, case studies, implementation challenges, recommendations, and resources. The background and legal sections are designed to familiarize the reader with sources of and problems related to mercury releases, and the existing regulatory framework to address mercury issues. The case studies feature three states – chosen in part based on geographic diversity – with innovative mercury reduction programs, with the intent of offering insight into the development of successful programs in varying political settings. The implementation challenges section draws on the experiences of state and county agency staff working on mercury reduction programs, including identifying some of the roadblocks that can affect the design, scope and success of a program. Recommendations include criteria for establishing comprehensive programs, along with a checklist of questions to consider for both new and existing programs. A list of resources is also included to guide the reader to additional sources of information.

Background

Impacts of Mercury in the Environment

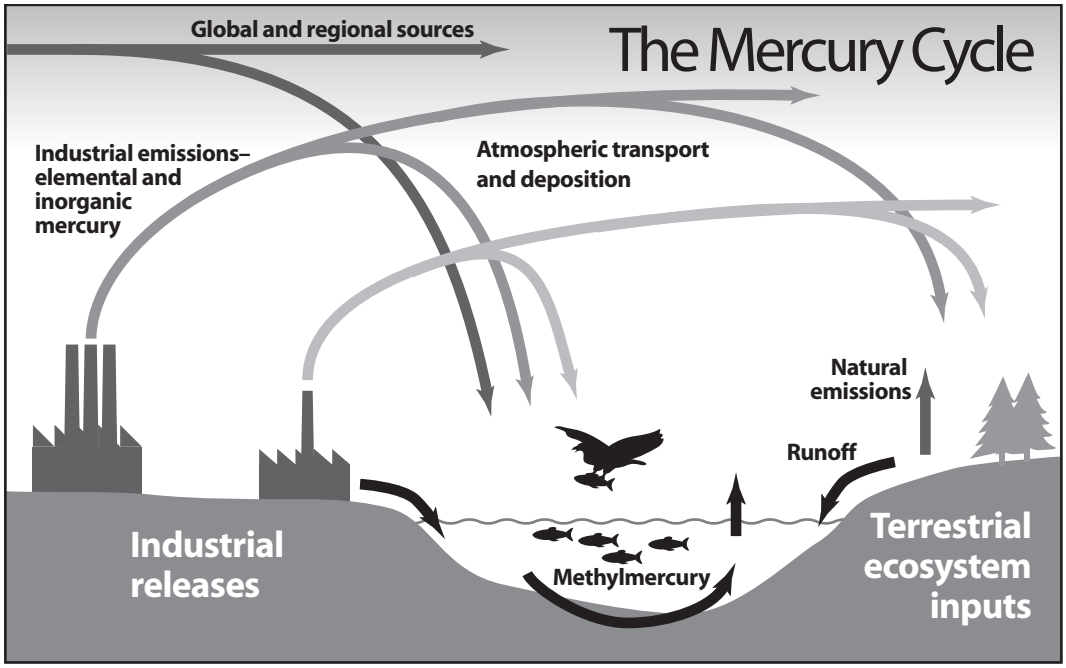
Mercury is a highly volatile, naturally-occurring element found in small amounts throughout the environment: in rocks, soils, the oceans and the air. As a metal, it persists in the environment, and can cycle between land, air and water. Mercury can circulate in the atmosphere for up to one year before being deposited to the ground, and can be re-released into the atmosphere after it does fall. Because mercury can be transported over long distances and cycle through the environment for a long time, it may take decades for mercury to be buried by sediments and removed from the long cycle of evaporation, transport, transformation, and deposition.

Although mercury is naturally occurring, its concentration in our environment has increased dramatically over the past 150-200 years due to mining and industrial activities— particularly coal combustion and incineration of wastes containing mercury.[1] During this time, research indicates that these and other human activities have caused the rate of mercury deposition around the world to increase by as much as a factor of 10 over pre-industrial levels.[2]

Mercury can exist in different chemical forms in the environment, which can be categorized into three general "species": elemental, inorganic, and organic mercury. Elemental mercury is pure metal, and is the form most commonly found in the gas phase in low concentrations in the air. Elemental mercury can be released into the environment when exposed to air because mercury volatilizes at room temperature. Common sources of releases include breakage of mercury-containing products like fluorescent bulbs and thermometers; the manufacturing mercury-containing products; and incineration of mercury-containing products.

Elemental mercury can be converted in the atmosphere to the inorganic species that is more readily deposited from the air to land or water surfaces. The inorganic mercury compounds include mercuric chloride, mercuric oxide, and mercuric sulfide.

In surface waters, certain types of bacteria in sediments transform inorganic mercury to organic forms, in particular, methylmercury. The amount of methlymercury produced and taken up by organisms is influenced by a number of other factors including organic carbon concentrations, pH, and sulfate levels.[3] Methylmercury is the type of mercury most readily absorbed by living things.



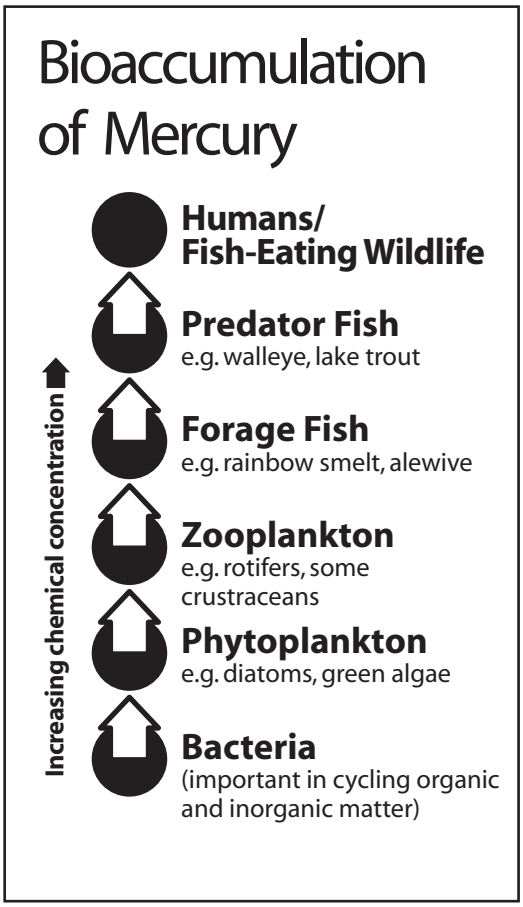
The Mercury Cycle

Mercury is a potent neurotoxicant. The effects of mercury exposure depend in part on the species of mercury involved. Elemental mercury (the kind found in thermometers, blood pressure devices, and other equipment) is of special concern when it is inhaled. Even at low levels, mercury can cause subtle but permanent damage to the brain and central nervous system, leading to effects such as impaired vision and learning difficulties.[4] At high levels, inhaled elemental mercury can damage the lungs, lead to kidney dysfunction, and can suppress the normal function of the immune system.[5] Although rare, acute mercury poisoning still occurs in the United States, especially when mercury spills occur in confined spaces.

Organic mercury, specifically methylmercury, is of special concern to people and wildlife due to its ability to take part in biochemical reactions, build up in the food chain, and remain in the body for long periods of time. In contaminated ecosystems, along each link of the food chain, the concentration of methlymercury in the tissues of successive species increases, a process called bioaccumulation (see figure). For humans and fish-eating wildlife, the mercury exposure pathway of greatest concern is consumption of fish contaminated with methylmercury.

Babies in utero and young children are particularly susceptible to harm from methylmercury exposure. While the human body in general has a limited defense system against methlymercury uptake by the brain, fetuses are even more susceptible to mercury uptake—methylmercury levels in fetal brains can be twice those in the maternal brain.[6] Infants exposed to chronic levels of mercury at critical times can show delayed development in walking and speech, and at higher levels can develop cerebral palsy or mental retardation.[7]

Human health and development can be affected in more subtle ways at lower levels of mercury exposure. Though debate is ongoing over what level of mercury exposure is "safe", epidemiological research in the Faroe Islands indicates that children of mothers exposed to mercury at relatively low levels still show developmental deficits



Bioaccumulation of Mercury

on neurological tests. A committee organized by the National Academy of Sciences (NAS) endorsed the Faroe Islands study as "critical" to determining acceptable exposure levels, and as a result supported the Environmental Protection Agency (EPA)'s current "reference dose" of 0.1µg methylmercury/kg bodyweight/day.

The NAS report also determined that at least 60,000 children born annually in the US are at risk of neurodevelopmental problems due to mercury exposure in the womb.[8] This finding was followed by a report on the first systematic national survey of mercury levels in the blood and hair of women of childbearing age and young children by the Centers for Disease Control and Prevention (CDC). Based on data in the report, it could be estimated that one in 10 women of childbearing age is exposed to levels of mercury potentially harmful to their developing fetuses, which translates into about 390,000 children born annually in the U.S.[9] Due to the higher susceptibility of fetuses and

young children to mercury exposure, many states issue separate health warnings targeting women of childbearing age and young children. To date, 43 states have issued at least one fish consumption advisory because of mercury contamination. Seventeen states have a statewide advisory covering either all inland lakes, rivers, or both, and nine states have at least one mercury advisory covering all coastal waters.[10]

It takes a surprisingly small amount of mercury in the water to contaminate fish to unsafe human consumption levels. The annual deposition of only 0.002 pounds of mercury—1/70th of a teaspoon—is enough to contaminate a 25-acre lake to the point that the fish in the lake are unsafe to eat.[11] To put this in perspective, the incineration of one mercury switch could release up to 3 grams of mercury (0.006 pounds). A typical mercury-containing thermostat can contain 1 to 6 of these switches.[12]

Tackling the Mercury Problem:

While the need to reduce mercury contamination in the environment is clear, it has been less obvious how best to tackle the mercury problem given its complexity. Mercury is a persistent element, has multiple sources, can cycle between various environmental media, and can be challenging to control in an end-of-pipe manner. This report examines the feasibility of developing comprehensive programs, with a focus on pollution prevention, as a means of eliminating mercury pollution.

Notes

[1] U.S. Environmental Protection Agency, Mercury Report to Congress, Volume I, EPA-452/R-97-003, December 1997.

[2] Bergen, T., et al. Mercury in the global troposphere: A three-dimensional model study. *Atmospheric Environment,* 1999. 33(10): 1575-1585; Mason, R.P. et al., 1994. The biogeochemical cycling of elemental mercury: Anthropogenic influences, *Geochimica et Cosmochimica Acta,* 58(15): 3191-3198.

[3] Driscoll, C.T. et al. The mercury cycle and fish in the Adirondack lakes, *Environmental Science & Technology,* 1994. 28(3):136-143.

[4] Clarkson, T.W. Mercury: Major issues in environmental health. *Environmental Health Perspectives,* 1992. 100:31-38.

[5] Bigazzi, P.E. Metal and kidney autoimmunity. *Environmental Health Perspectives,* 1999. 107:753-765.

[6] Clarkson T.W., The toxicology of mercury and its compounds, In *Mercury Pollution: Integration and Synthesis,* Edited by C J Watras and J W Huckabee, Boca Raton, FL, Lewis Publishers, 1994, pp. 631-641.

[7] Mahaffey K.R., Recent advances in recognition of low-level methylmercury poisoning, *Current Opinion in Neurology,* 2000; 13:699-707.

[8] Committee on the Toxicological Effects of Mercury, National Research Council, *Toxicological Effects of Methlymercury,* National Academy Press, Washington, DC., 2000.

[9] "Blood and hair mercury levels in young children and women of childbearing age—United States, 1999" *Morbidity Mortality Weekly Report* 50 (2001), pp. 140-143.

[10] See U.S. EPA, *Update: National Listing of Fish and Wildlife Advisories,* EPA-823-F-01-010, November 2001; U.S. EPA, National Listing of Fish and Wildlife Consumption Advisories database, http://map1.epa.gov/

[11] Raloff, Jo. Mercurial Risks from Acid Rain, *Science News,* 1991. 130:152-166.

[12] Mercury in Buildings. US EPA and Purdue University. http://abe.www.ecn.purdue.edu/~mercury/src/title.htm

CHAPTER 2

Legal Requirements and Administrative Programs Targeting Mercury

Regulatory Framework

There are a myriad of federal laws and regional initiatives governing the use, release and disposal of mercury by industry. The following provides a brief overview of the various regulatory programs and regional agreements between the U.S., groups of states, and Canada. States, counties, and municipalities in different parts of the country have in some cases gone beyond the federal framework and expanded their environmental programs by creating legislation, voluntary programs, local ordinances, statewide administrative rules, and other approaches to address the mercury problem.

Federal Standards/ Regulations[1]

Air Quality Requirements

The Clean Air Act (CAA) regulations contain national emission standards for mercury for a limited number of specific stationary sources that process or use mercury-containing substances and that emit mercury to the air (40 CFR § 61.50 et seq.). The standards to date and those in development are based on the "maximum achievable control technology" (MACT) for select industrial sectors. While the Act gives the EPA discretion (and encouragement) to develop technology standards that encompass front-end changes (process changes, materials substitution) as a vehicle for achieving low emission levels, EPA has not used that authority widely, and certainly not with sources that emit mercury. MACT standards have been developed for municipal, medical and hazardous waste incinerators and coke ovens. Sources for which standards are under development include coal-fired power plants (the largest mercury source in the U.S., and one that successfully stalled rulemakings throughout the 1990s), chlor alkali facilities (which were regulated under the pre-1990 Act, but for which updated, and predictably more stringent, emission limits will be set), and commercial and industrial boilers (which, like power plants, emit mercury depending on the fuel they burn).

While the Clean Air Act has historically regulated air pollutants solely by what is coming out of a smokestack, more effective are those approaches that encourage changes upstream of the smokestack.

The Clean Air Act also includes a provision requiring EPA to revisit MACT standards eight years after they have been finalized to determine whether they are protective of human health. This provision is referred to as the residual risk program, and although still in its infancy, many uncertainties remain as to whether EPA is able to accurately evaluate all risks remaining from the continued release of mercury and other toxic chemicals.

While the Clean Air Act has historically regulated air pollutants solely by what is coming out of a smokestack, more effective are those approaches that achieve stack emission reductions by changes made at the factory in places other than the smokestack. For example, when the state of New Jersey drafted its rules for implementing the MACT standards for medical waste incinerators, it not only issued a stack limit more stringent than EPA promulgated, it also included a separate provision requiring facilities to separate mercury-containing materials prior to incineration. A similar provision was adopted as part of municipal waste regulations in Massachusetts in 1998. States that have the authority to issue emission standards more stringent than federal standards can follow the lead of New Jersey and Massachusetts and take a similar approach with their mercury-emitting sources.

Water Quality Requirements

The Clean Water Act requires that any source directly discharging waste water to a lake, river or stream have a permit. With EPA approval, a state establishes the water quality standards for each of its surface waters, which then form the basis for water quality-based discharge limits. Each state must establish minimum water quality standards for certain priority pollutants such as mercury. The regulations establish an acute and chronic mercury concentration for surface waters, for both aquatic life and human health (see 40 CFR § 131.36).

Water quality standards are important both as standards to protect aquatic life, wildlife, and human health, and as benchmarks against which to assess environmental contamination. In addition to approving state and tribal programs, EPA also develops guidance for these programs. The most protective guidance values for mercury in surface water to date were promulgated in 1995 as part of the Water Quality Guidance for the Great Lakes System (Great Lakes Initiative for short, or GLI). The guidance was developed to enable the eight Great Lakes states to institute uniform, protective water quality standards for shared Great Lakes waters. The water quality criteria for wildlife was set at 1.3 parts per trillion (ppt), and for protection of human health (through fish consumption) at 1.8 ppt. Through National Pollutant Discharge Elimination Permits (NPDES permits), states are required to ensure that discharge effluents do not cause violations of the ambient standards. Also, in 2000, EPA phased out the use of mixing zones in the Great Lakes (sections of a water body where excessive discharges are allowed based on the assumed

dilution potential of the receiving waters) for mercury and other PBT chemicals. While variances are allowed in specific cases, the new system has the potential to encourage significant pollution prevention efforts upstream in the Great Lakes basin in order to meet the more protective mercury criteria.[2]

While issuance of and compliance with strong NPDES permits is important in ensuring protection of waters from point source discharges of mercury and other chemicals, it is also important to address nonpoint sources (such as agricultural runoff, urban runoff, and air deposition), which are major causes of impairments in thousands of water bodies across the country. The Clean Water Act's Total Maximum Daily Load (TMDL) provision requires that states identify impaired waters and develop restoration plans so that those waters meet water quality standards (40 CFR § 130). The plans must take into account both point and non-point sources of pollution to the impaired water body, any natural background, and a margin of safety. The states then have flexibility in determining how necessary reductions will be distributed among the identified sources in order to meet the target for the water body.

Thousands of water bodies around the country are impaired due to mercury contamination, and it is generally assumed that for most water bodies most of the mercury enters via air deposition. For many of these waters (lakes in particular), it is likely that reductions—and in many cases virtual elimination—in mercury air pollution in the regions of concern will be necessary in order to meet the TMDL water quality targets. Because of the challenges in controlling and then disposing of mercury, pollution prevention approaches that eliminate or significantly reduce the air emissions can have significant value in helping to meet the TMDL target. Because so many individual mercury TMDLs are required around the country—one for each water body in each state, NWF proposed to EPA that states be given an alternative option of planning to entirely phase out mercury uses and releases in the state in order to meet the TMDL obligations. As of spring 2002, discussions between EPA Region 5, Great Lakes states, and NWF and other environmental groups were ongoing.

The Safe Drinking Water Act regulations require a public water system to provide drinking water with a maximum contaminant level of 2 micrograms per liter (or parts per billion (ppb)) for mercury (see 40 CFR § 141.60). However, except in cases of extreme industrial contamination, such high levels would rarely be reached in surface water supplies. On the other hand, the low GLI criteria values for protection of wildlife and human health through consumption of contaminated fish can be regularly exceeded in surface waters far from industrial sources (i.e., impacted largely by atmospheric deposition).

Thousands of water bodies around the country are impaired due to mercury contamination, and it is generally assumed that for most water bodies most of the mercury enters via air deposition.

Hazardous Waste Requirements

The Resource Conservation and Recovery Act (RCRA) requires waste material that exhibits toxicity for mercury to be managed as hazardous waste (40 CFR § 261.33). Additionally, discarded commercial products containing mercury must be managed as hazardous waste (40 CFR § 261.33).

In 1995, the U.S. EPA issued the federal Universal Waste Rule (UWR) (40 CFR § 273 et seq.) as an amendment to RCRA. The UWR had as a major goal to reduce the regulatory burden on hazardous waste-generating businesses. The predicted side benefits of streamlining the regulatory process was to reduce the amount of hazardous items in the solid waste stream as well as encourage proper disposal and/or recycling of certain common hazardous wastes. The rule streamlined requirements related to labeling, accumulation time limits, and transportation. With regard to mercury-containing products, the UWR covers thermostats, and was amended in 1999 to include certain lamps such as fluorescent, high intensity discharge (HID), and mercury vapor lamps.

Because the UWR is less stringent than the original hazardous waste regulations, states that are authorized to implement the RCRA program are not required to adopt the UWR. Many states have adopted the UWR; some states (including Colorado, New Hampshire, North Dakota, Pennsylvania and Rhode Island) have

expanded it to include all mercury-containing devices.

A particular weakness in the federal hazardous waste program concerning mercury has been RCRA land disposal restrictions pertaining to mercury-containing wastes. EPA promulgated regulations in 1990 prohibiting land disposal of certain untreated mercury wastes, with the preferred option instead being incineration (55 FR 22569). In 1999, recognizing the problem of cross-media (i.e. solid waste—air) pollution when waste is incinerated, EPA announced that the agency would consider revising the treatment standards for mercury-bearing waste prior to land disposal (64 FR 28949). The agency is now considering other options for immobilizing mercury-containing wastes, as part of its reconsideration of the land disposal restrictions.[3]

Toxics Release Inventory

The Emergency Planning and Community Right-to-Know Act (EPCRA) regulations require facilities that manufacture, process or otherwise use more than 10 pounds of mercury or mercury compounds during a calendar year to report to EPA the quantities released and transferred (40 CFR § 372.22). The 10-pound reporting threshold for mercury was recently changed from the original minimum reporting threshold of 10,000 pounds (64 FR 58666).

Regional/Binational Agreements and Strategies

Great Lakes Water Quality Agreement[4]

The Great Lakes Water Quality Agreement, first signed in 1972 and amended in 1978 and 1987, expresses the commitment of the US and Canada federal governments to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin ecosystem. The Agreement describes a number of objectives and guidelines to achieve protection of the Great Lakes. It also serves to reaffirm the rights and obligation of Canada and the United States under the Boundary Waters Treaty.

The 1982 protocol included amendments that strengthened the programs, practices and technology described in the 1978 Agreement and increased accountability for their implementation. New annexes addressed atmospheric deposition of toxic pollutants, contaminated sediments, groundwater, and nonpoint sources of pollution. Annexes were also added to incorporate the development and implementation of remedial action plans for Areas of Concern and Lakewide Management Plans to control critical pollutants. The Agreement includes strong language on the need for the federal governments to virtually eliminate persistent toxic substances from the Great Lakes Basin.

While the GLWQA includes ambitious goals and a framework for joint binational cooperation to address mercury and other toxic chemical contamination of the Great Lakes, it remains the prerogative of the federal governments and the states and provinces to actually develop the necessary regulations and other programs to achieve the virtual elimination goals.

U.S. EPA Persistent, Bioaccumulative and Toxic Pollutants Strategy & Mercury Action Plan[5]

In November 1998, the U.S. EPA released its Agency-wide Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants (PBT Strategy). The goal of the PBT Strategy is to identify and reduce risks to human health and the environment from current and future exposure to priority PBT pollutants. Its intent is to better coordinate agency efforts in anthropogenic releases of certain chemicals to protect ecosystems and human health. The

agency proposes to draft action plans for mercury and other chemicals (such as alkyl-lead, hexachlorobenzene, PCBs) included in the initiative. The Mercury Action Plan was released in draft form at the same time the PBT Strategy was unveiled, and has yet to be finalized.

The draft Mercury Action Plan outlined existing and proposed regulations concerning mercury, as well as voluntary mercury reduction efforts underway or planned. What was missing, however, both in the Plan and the PBT Strategy was a broader proposal for eliminating the use and release of PBTs. Anything short of this goal would not be sufficient in removing the threats associated with widespread PBT contamination, which was the intended purpose of the PBT Strategy.

Canada-U.S. Binational Toxics Strategy

The governments of the U.S. and Canada in April 1997 signed the Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin (also known as the Binational Toxics Strategy—"BTS").[6] The purpose of the strategy is:

> *"...to set forth a collaborative process by which Environment Canada (EC) and the United States Environmental Protection Agency (USEPA), in consultation with other federal departments and agencies, Great Lakes states, the Province of Ontario, Tribes, and First Nations, will work in cooperation with their public and private partners toward the goal of virtual elimination of persistent toxic substances resulting from human activity, particularly those which bioaccumulate, from the Great Lakes Basin, so as to protect and ensure the health and integrity of the Great Lakes ecosystem..."* [7]

The Strategy includes a goal of reducing releases of mercury from U.S. sources by 50 percent by 2006. A mercury workgroup is examining strategies for reducing mercury use in various sectors, primarily through voluntary initiatives.[8]

New England Governors and Eastern Canadian Premiers Mercury Action Plan

In 1998, the Conference of New England Governors and Eastern Canadian Premiers adopted the Mercury Action Plan (MAP) with a long-term goal of virtually eliminating mercury emissions in the region. The plan established an intermediate goal to reduce regional mercury emissions by 50% by 2003. The MAP includes six action categories: emission reductions, pollution prevention and waste management, research and monitoring, education and outreach, mercury stockpile management, and creation of a Mercury Task Force.[9]

The agreement calls for tighter controls on incinerators, utilities, and other sectors; elimination of non-essential uses of mercury in household and other products; and source reduction, segregation, and safe waste management to minimize releases of mercury in the waste stream. The signatories recognize that even with virtual elimination of anthropogenic mercury sources within New England and the Eastern Canadian Provinces, achieving the goals of the plan will require similar action by the U.S. and Canada on national scales.

Through the waste management arm of the Northeast states (Northeast Waste Management Officials' Association), the New England states have participated in the development of model products legislation to promote a consistent approach across the region for developing and implementing mercury reduction policies and programs.[10]

Notes

[1] The Northeast Waste Management Officials' Association has compiled regulatory information on the Universal Waste Rule, Toxics Release Inventory, and air, water and other solid waste regulations at: http://www.newmoa.org/newmoa/htdocs/prevention/topichub

[2] U.S. EPA, Final Water Quality Guidance for the Great Lakes System, http://www.epa.gov/docs/fedrgstr/EPA-WATER/1995/March/Day-23/pr-82DIR/pr-82.html Also, see general page, http://www.epa.gov/ost/GLI/

[3] U.S. EPA, Land Disposal Restrictions, http://www.epa.gov/epaoswer/hazwaste/ldr/mercury/index.htm

[4] International Joint Commission. http://www.ijc.org/agree/quality.html

[5] U.S. EPA, Persistant, Bioaccumulative and Toxic (PBT) Chemical Program, http://www.epa.gov/pbt/background.htm

[6] Environment Canada, U.S. Environmental Protection Agency. Canada-US Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin, signed April, 1997.

[7] Id.

[8] For information, visit U.S. EPA Binational Toxics Strategy Web site: http://www.epa.gov/bns/

[9] New England Governors/Eastern Canadian Premiers, Mercury Action Plan 1998, June 1998. Prepared by the Committee on the Environment of the Conference of New England Governors and Eastern Canadian Premiers.

[10] Northeast Waste Management Officials' Association, http://www.newmoa.org/newmoa/htdocs/prevention/mercury

CHAPTER 3
Promoting Solutions at the State Level

Mercury use is widespread in the U.S. It is used in packaging, light switches (in cars, freezer chests, ovens, for example), fluorescent lamps, thermostats, fever thermometers, lab chemicals, cosmetics, vaccines, and dental fillings, among others. The mercury in these products can be released to the environment either when the products are disposed of in a landfill, incinerated with other waste, or poured down the drain. Mercury also is a trace element found in fossil fuels, particularly coal; the mercury is released to the air when coal is burned to generate electricity or heat. The largest sources of mercury releases into the air in the U.S. are coal-fired power plants, industrial boilers, waste incinerators, and manufacturers.

Over the past several years, there has been a tremendous amount of activity on the state level to reduce mercury sources. These efforts cover a broad spectrum in terms of design and scope, from educational programs that raise public awareness about mercury sources and voluntary initiatives to encourage recycling, to statutes banning the sale of specific mercury-containing products. Much of this activity has been spurred on by increased visibility of the issue among decision makers and the public, as well as by regional reduction agreements, most notably the agreement signed by the New England Governors and Eastern Canadian Premiers (see chapter 2).

In many cases, individual state action has spurred activity in other states. Minnesota was the first state to take significant steps to eliminate mercury-containing products and became a model for others. Starting in 1992 Minnesota made a commitment to phase out intentional uses of mercury, and since then the state has expanded the scope of its program. The program has grown beyond an initial focus on restrictions or phaseout of mercury use in batteries to include labeling of mercury-containing switches, electrical relays and other electronic devices; a ban on disposal of mercury-containing dental equipment and supplies; a ban on mercury manometer use; a ban on mercury-containing toys and other novelty items; and labeling and disposal restrictions on fluorescent, high intensity discharge and mercury vapor lamps.[1]

The largest sources of mercury releases into the air in the U.S. are coal-fired power plants and industrial boilers, waste incinerators, and manufacturers.

Since the late 1990's, and especially following the release of EPA's Mercury Study Report to Congress in 1997, other states have been building on Minnesota's earlier successes and developing mercury reduction programs. Vermont was next to chart new territory by expanding labeling requirements for mercury products. In 1998 the state passed legislation requiring all manufacturers of mercury-added products, including lamp manufacturers, to inform the state about the products they sold in Vermont, and label their products as of 2002. The legislation also prohibited the disposal of labeled mercury-added products in municipal trash. The lamp manufacturers, who were exempted from the only existing labeling statute (in Minnesota) sued, claiming that the state of Vermont had no right to compel them to label, but in the end, the state prevailed.[2]

Now, with every passing legislative session, additional states successfully pass mercury reduction bills. For example, approximately 50 mercury-related bills were introduced in states in 2001, with at least 10 passing in six states.[3] By far the most common legislative action being taken—even by those states that otherwise don't have mature mercury reduction programs—is banning the sale of mercury fever thermometers. Other states, including Oregon and New Jersey, have followed the lead of Minnesota and other states in developing multistakeholder task forces recommending approaches to reduce—or in the case of Oregon eliminate—mercury releases in the state. For an overview of states' mercury activities, see Appendix A.

Below are some recent examples of successful legislation targeting other sectors (we only highlight the portion of the bill that is unique and new):

- **Oregon** (2001)—HB 3007 prohibits the sale of motor vehicles that contain mercury light switches;[4]
- **Michigan** (2000)—SB 1262 phases out mercury use in school classrooms by 2004;[5]
- **New Hampshire** (2002)—HB 1251 requires dentists to comply with specific waste handling requirements, and instructs dentists to provide information on mercury amalgam fillings prior to use in a patient;[6]
- **Maine** (2002)—LD 1921 requires automobile manufacturers to establish a statewide system to collect, consolidate and recycle mercury-added switches;[7]
- **Rhode Island** (2001)—H-6161 prohibits disposal of mercury-containing waste products, and requires manufacturers to ensure programs are in place to collect and recycle the products at the end of their useful life. If programs are not in place, manufacturers are financially responsible for establishing them.[7]

Several states have taken steps to regulate coal-fired power plants—one of the more difficult political targets at both the state and federal levels.

Even in those states where legislative efforts have been unsuccessful, state agencies have established a wide array of collection, recycling and educational programs. The states and programs are diverse, covering a broad geographic area and a variety of mercury sources, including:

- **Kansas**— statewide biennial Clean Sweep Mercury Collection program, with collection sites set up in 90 of 105 counties;[9]
- **Indiana**— voluntary partnership with EPA, the Lake Michigan Forum and three steel mills to develop plan for eliminating mercury in steel production;
- **New York**— program established to reduce the use of mercury-filled manometers in dairy farms;[10]
- **Virginia**— partnership with state dental association to set up 22 dental mercury collection sites across the state.[11]

Despite a lack of public and media attention, product packaging is a source of mercury pollution and a case where significant progress has been made toward mercury reduction. Packaging makes up one-third of the municipal solid waste stream, and is laced with mercury, hexavalent chromium, cadmium and lead used as stabilizers or coloring agents. In 1989, the Council of State Governments drafted model state legislation that would phase out the use of these metals in a four-year timeframe. As of December 1999, 18 states had adopted the packaging legislation, which will significantly reduce inflows of toxics into incinerators.[12]

Finally, several states have taken steps to regulate coal-fired power plants—one of the more difficult political targets at both the state and federal level. Massachusetts, Illinois, New Hampshire, and New York have enacted legislation requiring power plants to cut their mercury emissions along with emissions of sulfur dioxide, nitrogen oxides, and (in some cases) carbon dioxide. Wisconsin has drafted rules that would require coal-fired power plants and other major sources in the state to reduce their mercury releases by 90 percent over a 15-year period. In this regard, many states are leaps and bounds ahead of the federal government, which won't have emission standards implemented until 2007 assuming no further delays.

While some of the states whose efforts are described above clearly rise to the top of the list in terms of having the most developed or aggressive mercury reduction programs, we chose not to focus on them for the following case studies. Our interest in the next section is to illustrate less well-known programs which could offer encouragement to those initiating mercury reduction efforts. Therefore, for the case studies we selected three geographically and politically diverse states that have initiated innovative programs, either statewide or local, that have received less public notice than the cutting edge efforts in Vermont and Minnesota, but which might serve as useful models for regulators and advocates.

Notes

[1] U.S. EPA, *Mercury Study Report to Congress,* Vol. VIII, Office of Air Quality Planning & Standards and Office of Research and Development, EPA-452/R-97-010, December 1997.

[2] See Mercury law given new life, November 8, 2001, http://rutlandherald.nybor.com/News/Story/37103.html

[3] For an update on mercury bills introduced in the 2002 legislative session, see http://www.mercurypolicy.org/new/documents/StateandFedHgLegislation012902.pdf

[4] See Oregon House Bill 3007, http://www.leg.state.or.us/01reg/measures/hb3000.dir/hb3007.b.html

[5] See An Act to amend 1926 PA 451, et seq., http://www.michiganlegislature.org/documents/1999-2000/publicact/2000-PA-0376.pdf

[6] See An Act relative to the use of mercury amalgam fillings by dentists, http://gencourt.state.nh.us/legislation/2002/HB1251.html

[7] See An Act to Prevent Mercury Emissions when Recycling and Disposing of Motor Vehicles, http://janus.state.me.use/legis/status/gateway.asp?LD=1921

[8] See The Rhode Island Regulation of Products Containing Mercury Act of 2001 http://www.rilin.state.ri.us/BillText/BillText01/SenateText01/S0661.htm

[9] See Kansas—Don't Spoil It!, http://www.kdhe.state.ks.us/kdsi/index.htm

[10] See New York State Department of Environmental Conservation, Dairy Farm Mercury Manometer Project, http://www.dec.state.ny.us/website/ppu/p2dfarm.html

[11] See Pollution Prevention Virginia, No. 14, http://www.deq.state.va.us/pdf/opp/p2va.pdf

[12] For a list of states and contact information, visit http://www.newmoa.org

CHAPTER 4

Case Studies

Introduction

In this chapter, we examine efforts by several states that illustrate innovative approaches to specific aspects of the overall problem of mercury releases. As noted in the previous chapter, several states, including Minnesota, Vermont and Maine, have made significant progress towards comprehensive mercury reduction efforts grounded in legislation, framed by statewide programs and fostered by regional cooperative agreements. These programs have been widely publicized and constitute significant progress toward mercury elimination. In the following case studies, however, we have chosen to focus on states in the process of program design and implementation, to illustrate different approaches to individual aspects of the mercury reduction puzzle. Similar approaches may serve as elements of a broad comprehensive strategy where political conditions permit, or may be adopted piece by piece over time where resistance to mercury reduction efforts is stronger.

For the purposes of this report, our focus is specifically on detailed examination of one or two promising or imaginative programs per state. Though each case study gives general background information to contextualize the highlighted programs, it is only a sketch of the selected states' overall mercury reduction efforts. We do not attempt to assess the strengths and weaknesses of the entire range of state programs referenced; instead we describe particularly noteworthy aspects of each state's overall effort. In closing we offer a brief assessment of important factors to keep in mind when modeling programs after those described based on our own observations and on the experience of state agency staff and advocacy groups.

State Stats
Washington

Mercury fish consumption advisories for certain species within the following waterbodies

- Sinclair Inlet
- Eagle Harbor
- Lake Roosevelt
- Lake Whatcom[2]

Statewide health advisory for women of childbearing age and children under 6 to not consume

- Shark
- Swordfish
- Tilefish
- King mackerel
- Tuna steaks[3]

Major sources of mercury

- Transalta Centralia power plant
- Pulp and paper boilers, processes
- Other commercial and industrial boilers
- Medical/municipal waste incinerators

Mercury regulatory framework

- Water quality criteria
  - **Aquatic life**
    - fresh water acute: 2.1 µg/l (parts per billion)
    - fresh water chronic: 0.012 µg/l
    - marine acute: 1.8 µg/l
    - marine chronic: 0.025 µg/l
  - **Human health**
    - freshwater: 0.14 µg/l
    - marine: 0.14 µg/l
- Groundwater standard (for drinking water use): 2 µg/l
- Air Toxics regulation:
  Best available mercury control technology standards for new or modified air toxics sources
- Other:
  mercury sludge concentration limits for land application: < 75 ppm

Northwest Region: Washington State

Introduction

Washington, which is still in the process of developing a mercury reduction program, highlights some of the issues encountered in early stages of a statewide mercury initiative. Thus it may help offer insight into some of the significant forces that can motivate state actions.

Washington is worthy of note because in response to strong citizen concern and effective advocacy, the state chose to develop a comprehensive plan, finalized in December 2000, to eliminate all major persistent, bioaccumulative toxic chemicals (PBTs).[1] This plan provides an overall context for mercury reduction efforts very different from states where mercury is targeted as a single issue. As we illustrate in our evaluation, the establishment of such a plan is not a guarantee of progress on the mercury issue, since implementation may lag due to political, financial or management constraints. Yet by directing state efforts towards cross-media use and waste reduction efforts, it provides a framework to establish a comprehensive network of programs that can effectively lead to overall reductions.

A major motivating factor for the state has been a high level of support and pressure applied by local governments and environmental organizations. The combination of strong waste reduction outreach efforts at the county level and advocacy work by many disparate nonprofits has resulted in strong commitments at the state level. Also, through their vested interest in the quality of their land, water, and air, an aware and educated public provides a foundation of political support for environmental improvement.

Background

In Washington, programs are generally operated on the county level with the state providing some support for local efforts. Counties are considered manageable units for program implementation. For example, the King County hazardous waste program, well-funded through a surcharge on garbage and wastewater treatment fees, is able to pilot mercury reduction programs.[6] The state Department of Ecology looks to the counties to see how programs are progressing and assess their applicability on the state level.

In cooperation and consultation with toxics advocacy groups, Snohomish and King Counties developed programs to deal with mercury and other toxic chemicals years before the state developed a comprehensive toxics strategy. Following county health district rules, Snohomish County's Moderate Risk Waste Program (WRW) diverts toxic chemicals from landfills through collections at transfer stations. The county has been accepting mercury for a number of years and has recently started processing lamps in response to Washington's adoption of the Universal Waste Rule.[7]

King County, which includes the city of Seattle, first established a voluntary approach to reducing of mercury in dental wastes, then developed requirements that all dentists install amalgam traps.[8] In addition, King County has started its own fluorescent lamp recycling program, and thermostat and thermometer collection programs are in the planning stages.[9]

These significant county efforts generally have been strongly influenced by non-profit advocacy groups. As the state lacks a regulatory program like the Great Lakes Initiative or a regional commitment as in New England, nonprofit groups in Washington have been the central driver in obtaining the state's commitment to a comprehensive PBT initiative with mercury as the first target pollutant.

With non-profits acting as watchdogs and forces for political change, and counties implementing mercury reduction programs, Washington's state Department of Ecology's function is largely to coordinate efforts and develop information for efficient outreach and reliable assessment of progress.

Programs

As stated previously, most programs in Washington continue to be developed and implemented at the county level. The creation and implementation of a statewide mercury action plan will help create consistency across county-based pollution prevention efforts

Programs

Organization	Program	Scope	Details	Contacts[11]
Local Hazardous Waste Management Program in King County	Dental Waste Management Project	Education/ Outreach & Amalgam Separation Regs	County gov't program for education about management of metal-bearing dental waste	Gail Savina 206-263-3062
Local Hazardous Waste Management Program in King County	Fluorescent Lamp Recycling	Education, Recycling/ Disposal	Program works with small quantity generators to recycle lamps through education, on-site assistance, incentives	Susan McDonald 206-263-3059
Northwest Product Stewardship Council	Mercury Subcommittee	Information & Resource Sharing	A forum for representatives from government agencies and utilities in Oregon and Washington to network and potentially coordinate reduction efforts	Lauren Cole 206-296-4363
Snohomish County Solid Waste Management	Snohomish County MRW Program	Recycling/Disposal	Collection facility for Hg waste and educational and technical assistance for businesses	Dave Shea 425-388-6052

across the state. Groups like the Northwest Product Stewardship Council—a forum for representatives from government agencies and utilities in Oregon and Washington—can also expand the range of local efforts regionally by creating a network and a conduit for information.[10] And while the statewide PBT initiative is in its growth stage, King County continues to move ahead, expanding its mercury reduction program and testing the effectiveness of different types of initiatives.

Innovations

Comprehensive Persistent Bioaccumulating Toxics (PBT) Strategy

In August 1998, in response to public pressure from health and environmental advocacy groups, the Director of the Department of Ecology initiated an effort to look at the problem of PBTs in Washington. In December of that year, the department held a public symposium to begin discussions on the need to actively reduce and, where possible, eliminate PBT uses and releases.

The discussion process, along with feedback from many types of organizations, resulted in the development of a comprehensive, statewide PBT Strategy.[12] The goals of the strategy include:

- Reduce and, where possible, phase-out existing sources of PBTs by 2020
- Clean up PBTs from historical sources
- Prevent new sources of PBTs
- Build partnerships to promote and coordinate PBT reduction and elimination efforts
- Ensure PBT efforts address cross-media effects
- Improve public awareness and understanding of PBT problems and solutions
- Promote the development of a research base for informed decisions on PBT reduction measures
- Identify and prioritize additional PBTs

Ecology has identified 25 target toxic chemicals for elimination. Mercury is the first because of quantities in the environment, widespread consumer use, public awareness, and EPA selection as a priority toxic chemical.[13] The PBT plan has significant legislative support: Ecology and the Department of Health received $800,000 for development of action plans during the 2001-2002 biennium. As of spring 2002, Ecology was in the process of drafting a mercury action plan.[14]

The Washington Toxics Coalition (WTC) and Washington Public Interest Research Group (WashPIRG) have been major drivers of toxics reduction efforts in the state, including development of the PBT plan. WTC coordinates with a diverse set of organizations including the Washington Physicians for Social Responsibility, People for Puget Sound, League of Women Voters, and other groups. Gregg Small, Executive Director of WTC, suggests that three elements have led to their success in advancing mercury and other toxics reduction efforts:

- A diverse coalition that is active and committed to the process on a long-term basis;
- A conscious decision on whether to go after a single specific pollutant (e.g., mercury) or a broader concept—like the elimination of all PBTs; and
- A baseline of information. WTC's report, *Visualizing Zero,* which assessed toxics use and releases in the state and evaluated approaches to PBT reductions, helped to formulate the issue and identify possible avenues for action.[15]

WTC has acted as both a supporter and watchdog of Ecology's PBT efforts by helping to obtain funding for PBT programs, and applying pressure on the agency to implement the plan. WTC, and other groups, are also working on the legislative front to introduce specific mercury reduction bills.[16]

Assessment of Highlighted Programs

A comprehensive PBT strategy is a significant move away from the current framework of single-media regulations, which is clearly inadequate to deal with persistent, multimedia pollutants such as mercury. By encouraging information sharing and comprehensive approaches across state programs, such a strategy can avoid the problem of simply moving a pollutant from one medium to another without effecting lasting reductions.

However, while development of a comprehensive PBT strategy is an excellent first step, it does

not ensure aggressive or timely action—as is evidenced by the four years which have elapsed from the start of the PBT planning process to drafting of the mercury action plan. Time and energy devoted to pinning down the precise details of a comprehensive plan, and to developing action plans on mercury and other individual toxics, might well have accomplished actual PBT reductions if put towards education, collection and phaseout efforts instead.

Another feature that may weaken the plan is the lack of concrete interim deadlines for the general PBT program and for specific individual pollutants. Without specific, measurable outcomes required by definite deadlines, it may be difficult to adequately assess progress towards the plan's laudable but very long-range goals.

In addition, despite the PBT plan framework, political resistance in the legislative arena has made enacting comprehensive mercury reduction measures difficult. Legislation introduced in 2002 which included product labeling and phaseouts was reduced within hours to a measure requiring Ecology to do public outreach about the health risks of mercury. Thus, support for general planning may not always translate into enactment of concrete measures to move reductions forward.

Sources of Additional Information

Washington Department of Ecology
PBT Website:
http://www.ecy.wa.gov/programs/eap/pbt/pbtfaq.html

Washington Toxics Coalition:
http://www.watoxics.org/
http://www.watoxics.org/PBTreport.htm

Northwest Product Stewardship Council:
http://www.productstewardship.net/about.html

King County Programs:
http://www.metrokc.gov/environ.htm
http://www.metrock.gov/hazwaste/dental/
http://www.metrokc.gov/hazwaste/fluor/

Snohomish brochure:
www.co.snohomish.wa.us/publicwk/solidwaste/programs/residential/fluorhouse.pdf

State Stats
Wisconsin

Mercury fish consumption advisories

Statewide for certain species; plus 100 more restrictive advisories for specific water bodies

Major sources of mercury

- Coal-fired power plants
- Coal-fired commercial/ industrial boilers
- Chlor-alkali plant
- Petroleum sector
- Incineration (including medical, municipal, sewage, household)

Regulatory framework

- Water quality
  Surface water quality criteria for protection of wildlife and human health are set according to Great Lakes Initiative at 1.3 ng/l (or parts per trillion) and 1.8 ng/l respectively.

- Air toxics
  Ambient mercury concentrations to protect against acute and chronic inhalation: not to exceed 1 ug/m3, averaged over a 30 day period; no greater than 2,300 grams per 24-hour period from mercury cell chlor-alkali plants; no greater than 3,200 grams per 24-hour period from sewage sludge incinerators or sewage drying plants (NR 446). New, modified or existing sources have to meet ambient mercury concentrations (NR 445).

  (NR 446 is currently undergoing revision, to extend mercury control requirements to coal-fired power plants and other major stationary sources.)

Midwest Region: Wisconsin

Introduction

As one of the Great Lakes states, Wisconsin has a high stake in reducing mercury due to the level and extent of mercury contamination in fish, and a significant freshwater-based tourism industry in the state. Much farther along in implementing mercury reduction programs than most states, Wisconsin has chosen a generally community-oriented source/waste reduction approach and has shied away from creating regulatory measures until more recently.

The most remarkable element of the Wisconsin program is the commitment and degree of participation in mercury reduction efforts on the community level, which enables a small number of staff at the Wisconsin Department of Natural Resources (DNR) to support a wide variety of programs.

As in Washington, one of the strong motivating factors is the general public's support for strong environmental measures. Fishing activities make up much of the state's important tourism and recreation industries. In addition, tribal interest in water quality and preserving fish as a valued food source has further raised the profile of the issue. And finally, well-publicized mercury spills in communities around the state have increased public awareness of the need for preventive measures to avoid such mercury contamination.

Background

To address Wisconsin's mercury problem, the state has generally taken a program-based approach rather than a legislative one. .

Following a 1997 inventory of mercury use in the Milwaukee area, as well as research in other Great Lakes states, the DNR initially focused its mercury outreach and collection programs on (1) significant users of mercury or mercury-containing products: the medical, dental, HVAC (heating, ventilation, and air conditioning) and dairy sectors, and (2) settings such as schools where the potential for public health harm from mercury spills could be significant. Household mercury was also addressed via public informational events, and thermometer exchanges.

Mercury reduction work has developed largely at the community level through the Mercury Reduction Program, consisting of partnerships between the DNR and communities around the state. Additional education has been directed to specific sectors where releases may be high. For example, after new data suggested the importance of auto switches to mercury air emissions from steel recycling, The DNR developed a program for automotive switch recycling, working with auto salvage operations throughout the state.

Following the recent broadening of the state's mercury fish advisory to cover all water bodies in the state, Wisconsin is developing additional tools to address mercury. The DNR has proposed administrative rules to reduce mercury emissions from electric utilities, and cap emissions from major stationary sources. The community Mercury Reduction Program will increasingly be linked to a formal permit variance for municipal and industrial discharge permits. And statewide mercury thermometer ban legislation was also introduced in 2002.

Programs[17]

Organization	Program	Scope	Details	Contacts
Wisconsin Department of Natural Resources	Community Mercury Reduction Program	Outreach, waste and use reduction	See Innovations Below	Randy Case 608-267-7639
DNR & University of Wisconsin Extension	Medical Mercury Reduction	Education-healthcare	Workshops for healthcare providers to eliminate Hg in facilities	Randy Case 608-267-7639
DNR & University of Wisconsin Extension	Dental Mercury Reduction	Education- dental	Development and distribution of BMP guide to dentists for amalgam waste management	Randy Case 608-267-7639
DNR & University of Wisconsin Extension	School Mercury Reduction	Education and waste reduction	Workshops for science teachers on Hg reductions in schools, collection program, website and curriculum	Steve Brachman 414-227-3160
DNR	Thermostat Recycling Program (HVAC)	Recycling/ disposal, Education	A pledge program to encourage thermostat recycling and public education	Randy Case 608-267-7639
DNR	Dairy Hg Manometer Replacement Program	Product replacement & recycling	Program offers rebates to farmers for Hg manometers	Jerry Rodenberg 608-266-7715
DNR	Automotive Switch Recycling Program	Recycling/ disposal	Hg switch removal and recycling program for autos at Wisconsin scrap yards	Mark Harings 715-831-3263
DNR & Green Bay Metropolitan Sewage District	Wisconsin Mercury Recycling Program	Recycling/ disposal	Recycling Demonstration Grants for communities with unified Hg recycling programs	Randy Case 608-267-7639
Dane County (Madison) and Douglas County (Superior)	Hg Fever Thermometer Ordinance	Product Ban & Recyling/Disposal	A county-wide ban of Hg thermometers with municipality participation and cooperation from major pharmacies	John Reindl 608-267-8815

Innovations

Community Mercury Reduction Program

Wisconsin has taken a unique approach to helping the state's publicly-owned treatment works (POTWs, or wastewater treatment plants) reduce mercury discharges. The state has developed extensive tools and organizing strategies to work with local communities to involve citizens in reducing use of mercury added products and collecting and properly handling products already in use. Through the existing voluntary program, funded by a Clean Water Act 104(b)(3) Grant, RCRA PBT Grant, a Great Lakes National Program Office grant and DNR's own Recycling Demonstration Grant program, the state has established significant community based reduction programs in 16 of Wisconsin's largest communities.

To assist communities in developing and implementing Mercury Reduction Plans, the WDNR developed an exhaustive Mercury Reduction Sourcebook.[18] The state has also provided extensive consultation and organizational assistance to participating communities. However, local agencies commit to stewardship of each community program. In each community the POTW, together with the county recycling agency and health department, takes the lead in working with the public to design and carry out educational programs on the mercury issue, encourage recycling of mercury-containing products, and promote use of alternative products. Through extensive guidance, the DNR offers communities a variety of options for the type of reduction programs they may undertake, but leaves the final program design up to the locality involved. The DNR provides grant funding to the communities to support recycling programs, as well as staff assistance for coordination.[19]

The three main goals of the program are to reduce the use of mercury-containing products; recycle existing mercury-containing products; and prevent mercury spills. The hope is that, drawing on the education component of the program, communities will phase out mercury inputs over time, thus gradually reducing the need for collection and recycling efforts. By assisting with the startup process for mercury source and waste reduction efforts, the DNR hopes to enable communities to develop a foundation for addressing mercury problems on their own.

Communities have responded positively to the program. Substantial amounts of mercury have been diverted from the waste stream: approximately 5000 pounds were collected from participating communities during the 1998-1999 grant period and the current period is producing similar results. In addition, several communities have passed local ordinances, such as mercury fever thermometer bans, that both reduce their mercury burden, and may help promote more stringent statewide mercury product initiatives.

Up to the present, the program has been based on the premise that mercury reductions in the community will result in reduced levels in effluent from POTWs, but there has been no specific target for effluent level reductions. Like all Great Lakes states, however, Wisconsin is now bound by EPA's Great Lakes Initiative to require municipal and industrial discharges to use a more sensitive method (Method 1631)[20] to assess mercury levels in wastewater effluents, and to ensure that POTW discharges comply with the stringent 1.3ng/L surface water quality criterion established by the GLI. [21] The DNR was finalizing a revised Wastewater Mercury Strategy, including promulgating the new analytical method for wastewater discharges.

Recognizing that few if any POTWs in the state currently meet this level and that end-of-the-pipe mercury treatment is costly, the state is establishing a program to allow for a formal permit variance in exchange for mercury pollution prevention work.[22] If effluent testing shows mercury levels in excess of the new standard, facilities will be required to institute pollution prevention measures like those established in the communities already involved in the Mercury Reduction Program. Realistically, this effort will be required of nearly every community in Wisconsin with a central sewer system.[23]

Because of existing efforts at the community level, Wisconsin can build on the foundation of

knowledge and practice developed by trial and error, in some communities. Communities that obtain variances under the new program can make use of the Sourcebook, guidance documents and other resources developed through the Mercury Reduction Program to help them achieve mercury pollution prevention goals.

The state's role in this process will include assisting communities in developing mercury reduction plans as part of the variance process, verifying on a yearly basis whether they are carrying out those plans in a timely and effective manner, and tracking mercury levels in effluent to assess reductions achieved over time. If facilities fail to take active steps to reduce as promised in their reduction plans, they will fall under regulatory supervision, with a stepped program utilizing sewer use ordinances and individual permit limits to reduce mercury inflows.[24]

The existence of a broad base of mercury-reduction knowledge and experience in multiple communities across the state appears likely, however, to enable most communities to actively pursue mercury reductions in an effective manner.

Assessment of Highlighted Programs

Clearly the strength of the Wisconsin approach has been its strong connection to local communities and decision-makers, including local citizens. The extensive outreach materials provided to participating communities, and the subsidies available to underwrite the often significant costs of collection and recycling activities have allowed local communities to execute programs delegated to state regulators elsewhere.

As with any program, however, there are also areas where the initiative might be strengthened.

Though outreach and collection efforts appear to have accomplished significant reduction in mercury wastes, it is not clear that they have had noticeable impact on consumer purchasing or manufacturer behavior. Thus mercury-added products may continue to flow into communities, to be handled at the end of life at the expense of state and other taxpayers. Building on public awareness of mercury dangers by developing product labeling, disposal and phaseout legislation could ensure that product inflows are reduced significantly and the major effort expended in the community-based program has a permanent effect.

In addition, while collection of mercury-added consumer products and reductions in their use are important and valuable activities, additional reduction efforts may be needed to actually achieve a significant decline in mercury inflows to sanitary sewer systems. Though communities in the Mercury Reduction Program are encouraged to perform outreach to generators of significant wastewater mercury inflows like dental and medical facilities, additional statewide outreach and political pressure may be needed to achieve significant change. Without such change in these major sectors, compliance with the new Great Lakes water quality standards may be very difficult, even where other community reduction activities are highly successful.

And lastly, as with any pollution prevention program, it is essential that participation in activities not be confused with measurable results. The state of Wisconsin will require all POTWs receiving discharge permit variances to report regularly on their outreach and collection efforts, and to provide data on effluent mercury levels on a regular basis. However, continuing variances will apparently be based as much on whether the community shows active pursuit of pollution prevention measures, rather than on whether effluent data show significant reductions. If a community is not active, regulatory oversight would kick in as described above, but if the community is active yet the effluent levels do not show significant reductions, consequences are less well defined. Establishing linkage between effluent data and continued permit variances would strengthen the program's accountability and ensure that it has the desired effect of bringing communities into or close to compliance with the GLI standard.

Sources for Additional Information

Wisconsin Department of Natural Resources Mercury Website: http://www.dnr.state.wi.us/org/caer/cea/mercury

Wisconsin Mercury in Wastewater Strategy Revision Rule: http://www.dnr.state.wi.us/org/water/wm/ww/mercury/mercury.htm

Wisconsin Mercury Sourcebook: http://www.epa.gov/glnpo/bnsdocs/hgsbook/index.html

State Stats
Massachusetts

Mercury fish advisories
Statewide advisory for women of childbearing age, nursing mothers and children under 12. Advisory applies to fresh caught and store-bought fish of both freshwater and marine species.[25]

Major sources of mercury:[26]
- Municipal waste incineration
- Coal combustion
- Residential oil combustion
- Industrial oil combustion
- Medical waste incineration
- Municipal wastewater discharges
- Sludge incineration

Mercury regulatory framework:[27]
- Municipal solid waste combustor regulations (1999): Meet emission limit of 28 μg/dscm w/no percent reduction alternative (nearly three times more stringent than federal level)
- MA Toxic Use Reduction Act 1989: manufacturers must report their release or use of mercury that exceeds 10 lbs/year.
- MA Water Resource Authority Act 1984: prohibition on mercury releases in industrial wastewater enforced at 1 ppb limit in influent to wastewater treatment plants.

Utility Regulations
Covering SO_2, NOx, carbon dioxide, and mercury. Evaluation of mercury emissions control technology for coal-burning plants is underway.

Northeast Region: Massachusetts

Introduction
Like the Great Lakes states, New England states benefit from the support of a strong regional agreement—the New England Governors and Eastern Canadian Premiers (NEG/ECP) Mercury Action Plan—which sets mercury reduction goals for the northeast region. In addition, state and regional officials have worked closely to develop consistent programs related to that agreement since it was developed in 1998. Environmental officials have developed and proposed model mercury reduction legislation in all the New England states and established a clearinghouse for information and cooperation through the regional waste management organization, Northeast Waste Management Officials' Association (NEWMOA). They also serve together on the NEG/ECP Mercury Task Force and share information and strategic consultation on a frequent basis.

Massachusetts has built on the regional commitment to tackle mercury pollution by taking a largely regulatory approach. With the most comprehensive of the three state programs examined here, Massachusetts is notable for tackling use reduction of mercury products as well as waste reduction on the state level. The strict fish advisory protocol utilized by Massachusetts for over five years (now resulting in recommendations of sensitive populations to avoid consumption of all freshwater fish), in addition to offering additional public health protection, has also spurred public concern about the mercury issue.

Background

Public awareness of the mercury issue in Massachusetts is high, in particular because of a number of studies in recent years showing New England to be very hard hit by mercury deposition. As noted previously, the state health department has also taken an aggressive stance towards setting and disseminating mercury consumption advisories, increasing awareness of mercury-related health concerns among the general public. Building on public concern, numerous powerful advocacy groups, including Clean Water Action and the regional office of Health Care Without Harm, have used the research findings and consumption advisories as the grounds to forge broad coalitions in support of action.

Massachusetts state agencies, in particular the Massachusetts Department of Environmental Protection (DEP), have been working on mercury as an environmental concern since the early 1990s. Since passage of the state's Toxics Use Reduction Act, all businesses in the state are required to assess their use and release of toxic substances, including mercury, and attempt to reduce all such use. The law also established the Toxics Use Reduction Institute at the University of Massachusetts, Lowell to assist businesses in identifying and adopting alternatives to toxic products. However, the state's toxics use reduction programs applied only to manufacturing businesses and failed to address mercury releases from consumer products, incineration of mercury bearing wastes, dental discharges of mercury or power plant emissions.[28]

In 1998, under pressure from a regional coalition of environmental groups, the Governor of Massachusetts, along with the other members of the NEG/ECP, adopted a Regional Mercury Action Plan to respond to problems identified in the Regional Mercury Study completed by the Northeast States for Coordinated Air Use Management (NESCAUM) in 1998. In September 1999, following adoption of the NEG/ECP plan, Executive Office for Environmental Affairs Secretary Bob Durand initiated a Massachusetts Mercury Task Force composed of executive agency staff to develop a coordinated, multi-media strategy for achieving virtual elimination of the use and release of anthropogenic mercury. The Task Force developed the Massachusetts Zero Mercury Strategy (ZMS).

The ZMS examines three main areas: possible actions to reduce or control sources of in-state mercury releases; outreach and education; and research and monitoring. Targeted sources include: products containing mercury, medical and dental facilities, waste facilities, utilities, and other industries. Other sources are considered in the research and monitoring strategy.[29] Massachusetts expects to meet or exceed the interim regional Mercury Action Plan goal of a 50% reduction in emissions by 2003. Pushed by citizen activism and pressure from advocacy groups, the ZMS has set a second interim goal of a 75% reduction by 2010.

Technical support and coordination on the regional level, through the work of the NEG/ECP and NEWMOA, has been vital to the success of Massachusetts' mercury reduction programs. By working cooperatively to develop model legislation, Massachusetts and the other New England states have been able to propose consistent regionwide initiatives in addition to their individual mercury efforts. Massachusetts is also fortunate to have a very proactive and forceful regional water authority, the Massachusetts Water Resource Authority (MWRA) which has ratcheted down wastewater mercury standards to levels that compel use reduction upstream. The MWRA, which covers the eastern half of the state, has worked particularly hard with the health care community to push for alternative products and processes that reduce health care facilities' mercury discharges. But as with the other New England states, aggressive action in Massachusetts on mercury reduction programs has been largely motivated by public pressure channeled by advocacy groups.

Programs[30]

Organization	Program	Scope	Details	Contacts
Massachusetts Department of Environmental Protection (MDEP)	Dental Elemental Mercury Collection Program	Recycling/ Disposal	Collection Program for elemental Hg from dental offices	Judy Shope 617-292-5597
MDEP & University of MA at Lowell	University of MA at Lowell's Sustainable Hospital Project	Education/ Outreach & Info. Services	Web site provides info on Hg products in healthcare facilities & alternative low or no Hg substitutes	Catherine Galligan 978-974-3386
MDEP	Universal Waste Shed Grants	Collection & Recycling	Program provides storage sheds designed to hold Hg until sufficient quantity collected for bulk recycling	Judy Shope 617-292-5597
MDEP	Universal Waste Recycling Project	Recycling/ Disposal	Municipal collection program for Hg- containing products	Judy Shope 617-292-5597
MDEP	PPSI Hospital Project	Healthcare, Education	Program to audit 12 hospitals & recommend reduction policies & waste mgmt practices	Judy Shope 617-292-5597
MDEP, NEWMOA, EPA	Federal Facilities Audit Program	Policy, Hg Reduction/ Recycling	Collaborative effort to audit federal facilities and ID Hg reduction options	Judy Shope 617-292-5597
MA Executive Office of Environmental Affairs (EOEA)	MA Zero Mercury Strategy	Policy/ Legislative	Multi-agency strategy developed by EOEA to work towards virtual elimination of mercury	Regina McCarthy 617-626-1040
MA DEP & EOEA	School Mercury Education & Pollution Prevention Programs	Education, Recycling/ Disposal	Pilot outreach program for high and middle schools – Includes clean sweeps tools for school Hg mgmt	C. Mark Smith 617-292-5509
MA EOEA	Environmentally Preferable Purchasing, State Contracts	Policy, Use Reduction	See Innovations Section Below	Eric Friedman 617-720-3356
MASCO (Medical Academic & Scientific Community Organization) & MWRA	MASCO/MWRA Hospital Mercury Work Group	Product Elimination/Reduction, Research, and Outreach Documents	Collaboration between MWRA & MASCO to reduce amount of Hg discharged by hospitals	David Eppstein 617-632-2860
MA Water Resource Authority (MWRA)	MWRA Dental Project	Research, Education, Mgmt Options	Multi-purpose: estimate Hg contribution, examine possible remedies, research existing tech., educate dental community	Charles Bering 617-788-2309 Kevin McManus 617-788-2306

Innovations

Municipal Waste Combustor (MWC) Material Separation Program

In 1998, Massachusetts adopted a Municipal Waste Combustor (MWC) regulation for mercury in exhaust gas of 28 micrograms/dry standard cubic meter (µg/dscm), roughly three-fold lower than the existing federal standard of 80 µg/dscm. As part of the regulations, Massachusetts requires MWCs to develop, fund and implement material separation plans to segregate, recycle, and reduce mercury before it enters the waste stream. The regulations also require inlet testing to measure baseline mercury emissions.[31] With environmental, community,

and industry input, DEP promulgated a guidance document and facility plans were reviewed and approved in 2000.[32]

As part of one MWC program, the facility distributed 24 mercury sheds and roughly 20 spill kits to communities within their area. The incinerator operator sponsored mercury collection events and thermometer exchanges in participating communities. The incinerator corporation subsidized collection costs for these events, developed and provided advertising/press materials, and distributed replacement thermometers.

Other plans focused on encouraging businesses to recycle fluorescent lamps, in some cases by subsidizing the costs of recycling. Some companies paid for school clean-outs. Working with other DEP supported programs, 27 schools in 23 communities participated in education and clean-out programs. Ultimately, it was in the incinerator companies' best interests to remove mercury from as many sources as possible from of the waste stream in order to comply with the regulation.[33]

Though the main emphasis of the programs has been to divert mercury out of the waste stream, the schools and thermometer exchange programs suggest there is potential to expand the reach into the use reduction sector.

State Procurement

Environmentally Preferable Purchasing

Massachusetts uses the purchasing power of the state to directly influence manufacturers and producers of mercury-containing products. Through the state's environmentally preferable purchasing contract specifications, Massachusetts uses contract language to require purchase of reduced-mercury or mercury-free products. Four areas of state purchasing—medical supplies, dental supplies, appliances, and industrial and building supplies —now include contract language that limits or discontinues the purchase of mercury-containing products. The amended purchasing contracts are in different stages of implementation:

- Medical Supply Contract: Vendors cannot sell mercury-containing devices or products to state institutions unless there is no mercury-free alternative available. No mercury items have been sold since the contract went into effect.
- Dental Contract: Vendors cannot sell mercury-containing devices or products to the state unless there is no mercury free alternative available. This contract has also been awarded.
- Appliance Contract: Vendors cannot sell gas appliances with standing pilot lights (containing mercury) unless the agency does not have an electrical source near the appliance location. This contract has not yet been awarded.
- Industrial and Building Supplies Contracts: The inclusion of mercury restricting language in this set of contracts is in progress.[34]

Massachusetts' success in modifying purchasing contracts can be attributed to several factors. Existing environmentally preferable purchasing requirements in state contracts make adding mercury to the requirements easier than starting from scratch. In addition, purchasing teams include DEP representatives, which enables them to change specifications without delays for outside consultation. And the state provides education and incentives for vendors including pilot testing for new products, vendor fairs, and awards for good work.[35]

Perhaps the most innovative feature of this program is the extensive informational and technical support it receives from outside parties. In general, procurement offices are not experts at dealing with toxic chemicals such as mercury, but in Massachusetts, the state procurement office partners with INFORM, a non-profit research organization, to identify specific product sectors and develop needed information. This relationship is supplemented by designated environmental staff who work in the purchasing office on a day-to-day basis, providing in-house technical support. Having a source of expert information on mercury products allows the procurement office to obtain the information needed to confidently review contracts and develop specifications.

Assessment of Highlighted Programs

Massachusetts has developed a laudable framework for action through their Zero Mercury Strategy. In addition, regulatory efforts such as the MWC collection and reduction programs have motivated significant reductions in mercury-added products flowing into the state's waste stream. Finally, the state's purchasing policy amendments have encouraged availability of mercury-free products and services.

Despite these very strong efforts, Massachusetts still has no comprehensive mercury product legislation on the books. Thus there is no assurance that manufacturers will not continue to sell products in the state which will flow into the waste stream and either be released to the environment or become the responsibility of taxpayers to handle at the end of their useful life. While legislation following the NEG/ECP model is still under consideration in the legislature as of May 2002, its passage is not at all certain.

Inclusion of mercury specifications in state procurement contracts is an excellent first step towards providing incentives for manufacturers and wholesalers to eliminate mercury from the products they make or sell. The effort should be broadened to the entire range of applicable government contracts. In addition, consideration should be given to mandating the mercury-free procurement language through legislation, to ensure it remains in effect.

The MWRA's water quality standard for mercury has motivated significant mercury reduction efforts, but it only applies to dischargers in the eastern half of the state. In the absence of federal action, or even stricter rules, the state should consider adopting the standard statewide to protect water resources and continue to push mercury reduction/elimination efforts. In addition, efforts currently underway to encourage or mandate reductions in dental discharges should be pursued aggressively statewide.

Sources for Additional Information

Massachusetts Department of Environmental Protection Mercury Website: http://www.state.ma.us/dep/bwp/hgres.htm

Massachusetts Executive Office of Environmental Affairs Mercury Website: http://www.state.ma.us/envir/mercury.htm

University of Massachusetts at Lowell's Sustainable Hospitals Project: http://www.sustainablehospitals.org

INFORM, Purchasing for Pollution Prevention Project: http://www.informinc.org/PBT.htm

Massachusetts Water Resource Authority: http://www.mwra.state.ma.us

Medical Academic and Scientific Community Organization, Inc. Hospital Mercury Work Group: http://www.masco.org/mercury/

Toxics Use Reduction Institute http://www.turi.org/overview/index.htm

Notes

[1] Washington State Department of Ecology, Proposed Strategy to Continually Reduce Persistent Bioaccumulative Toxins (PBTs) in Washington State, Publication #00-03-054, December 2000.

[2] Fish and Shellfish Consumption Advisories in Washington State Due to Chemical Contamination, http://www.doh.wa.gov/ehp/oehas/EHA_fish_adv.htm

[3] Washington State Dept of Ecology Website: Health Fish Facts for Healthy Nutrition. www.doh.wa.gov/fish/FishAdvMercury.htm 2/19/2002

[4] U.S. EPA, National Emission Inventory, Draft, 1999.

[5] Washington Administration Code, Chapter 173-201A WAC

[6] Personal communication with Lauren Cole, Northwest Product Stewardship Council.

[7] Personal communication with Dave Shea, Snohomish County Solid Waste Management

[8] Personal communication with Gail Savina, King County Hazardous Waste program.

[9] Personal communication with Lauren Cole, Northwest Product Stewardship Council.

[10] Northwest Product Stewardship Council website. http://www.productstewardship.net/about.html

[11] Much of the information on the table is based on the NEWMOA mercury initiatives database

[12] Washington Department of Ecology. Proposed Strategy to Continually Reduce Persistent, Bioaccumulative Toxins (PBTs) in Washington State. Publication #00-03-054. 12/2000.

[13] Washington Department of Ecology, Strategy, on Persistant, Bioaccumulative Toxins (PBTs), http://www.ecy.wa.gov/programs/eap/pbt/pbtfaq.html

[14] Personal communication with Mike Gallagher. Washington Department of Ecology.

[15] Personal communication with Gregg Small

[16] Washington Toxics Coalition Fact Sheet. Mercury. November 2001.

[17] Information developed from NEWMOA database and WDNR handout

[18] Wisconsin Mercury Sourcebook http:www.epa.gov/glnpo/bnsdocs/hgsbook/index.html

[19] Personal communication with Randy Case, Wisconsin DNR.

[20] Method 1631 is designed to support water quality monitoring programs authorized under the Clean Water Act (CWA). According to the EPA, "in some cases, ambient water quality criteria (WQC) are as much as 280 times lower than the levels measurable using approved EPA methods available in the mid 1990s and required to support technology-based permits. EPA developed new sampling and analysis methods to specifically address State needs for measuring toxic metals at WQC levels, when such measurements are necessary to protect designated uses in State water quality standards."

[21] Wisconsin Mercury in Wastewater Strategy Revision Rule: http://www.dnr.state.wi.us/org/water/wm/ww/mercury/mercury.htm

[22] Ibid.

[23] Personal communication with Randy Case, WDNR

[24] Wisconsin Mercury in Wastewater Strategy Revision Rule, Op. Cit.

[25] Massachusetts Department of Public Health press release, "MDPH Issues New Consumer Advisories On Fish Consumption and Mercury Contamination," http://www.state.ma.us/dph/media/2001/pr0724.htm

[26] Massachusetts Zero Mercury Strategy. Chapter 1: Background.

[27] Report of the ECOS Mercury Workshop, Vol. II. St Louis, Missouri. Oct 20-21, 2000

[28] For more information on the TUR law, and the Institute, see http://www.turi.org/business/index.htm

[29] The entire Zero Mercury Strategy may be found at http://www.state.ma.us/envir/mercury.pdf

[30] Table based on information from the NEWMOA Mercury Reduction Programs Database, Report of the ECOS Mercury Workshop, Vol. II, and communications with Erik Friedman (MA EOEA)

[31] For copies of regulations, comments and associated documents see http://www.state.ma.us/dep/bwp/dswm/dswmpubs.htm#mwcsum

[32] Personal communication with Mark Smith and Judy Shope of the Massachusetts Dept of Environmental Protection.

[33] Personal communication with Judy Shope, Mass. DEP

[34] Personal communication with Lara Sutherland, INFORM,Inc.

[35] Personal communication with Eric Friedman, MA Executive Office of Environmental Affairs

CHAPTER 5
Tackling and Overcoming Roadblocks

Introduction

State and local officials have tried a number of diverse approaches to address the widespread mercury contamination problem. At the state level, these approaches have almost always been piecemeal—that is, they have not been part of a coordinated comprehensive program to reduce and eliminate mercury uses and releases. Regardless of the scope, many issues must be resolved in developing an effective mercury reduction program, from cultivating the political will to determining the extent of a regulatory mandate.

This section examines some of the challenges states face in mercury reduction efforts, based on the case studies in Chapter 4 and an assessment of other efforts. Some of the key issues that must be resolved in developing and implementing an effective mercury reduction program include achieving the political will and public awareness necessary to launch the program, developing an adequate mercury release inventory in order to track progress, determining the programmatic approach (e.g., voluntary vs. mandatory), overcoming resistance to change, and finding adequate resources to carry out the program.

Getting a Program Off the Ground

Political Dynamics

Two of the more significant challenges that may be faced in developing a mercury reduction program, as with many other environmental programs, are developing the political will among the regulatory agencies and obtaining the commitment by industry to carry out the program. Current efforts are taking place at a time when regulators, in general, from the federal level on down, have been promoting voluntary approaches over regulatory approaches. This is in spite of continued public interest in supporting strong environmental regulations.[1]

Some regulators may be wary of aggressive programs because of lack of interest at higher levels, or because of real or perceived reluctance of affected businesses to support such measures. Businesses themselves will question the need for programs that impose additional costs, absent clear rationale from a public health or environmental standpoint. But while quantifying the benefits of toxics reduction efforts is always difficult, regulators can note the general value in reducing mercury releases, based on the current widespread recognition of the extent of the contamination problem.

Until recently, many states have largely relied on federal requirements to address the mercury problem. Some states have developed task forces to gather ideas and generate interest in different approaches to address mercury contamination, but the follow through has often been limited. For example, Michigan developed a mercury pollution prevention task force in the mid-1990s, but apart from some modestly successful collection programs, there was no systematic effort to develop a broader reduction strategy. On the other hand, the impact of implementing federal regulatory controls on medical waste incinerators has been significant in the state—as of spring 2002, all but one medical waste incinerator in the state had been closed.

Other states, such as Vermont and Minnesota, have had more success in combining general task force investigations with development of programs to phase out or reduce mercury uses in specific sectors. But in these cases regulators must still deal with potential political and business opposition.

In essence, the challenge for advocates is overcoming a general reluctance by industry to make changes, and a reluctance by policy makers to impose mandates on industry. Despite this dynamic, it is possible to move a mercury phaseout at the state level.

Public Awareness

Having an engaged and active public is critical to overcoming political and business resistance that can hamper efforts to implement mercury reduction programs.

Public Perception of Mercury as a Problem— Despite 43 states issuing fish consumption advisories due to mercury contamination, the public is generally not aware of the risks mercury poses to children and wildlife, the sources of contamination, or what can be done to address them. Absence of public awareness results in lack of political support, which decreases the likelihood that the state will develop meaningful mercury reduction programs.[2] Compounding the lack of public awareness is the challenge of convincing some in the media of the importance of reporting on the broader mercury contamination problem, rather than limiting reports to cases of mercury spills or other local contamination episodes. While reports on local issues can be helpful to educate citizens about specific problems, broader coverage of the issue in a number of communities is necessary to develop awareness of the value of concerted state efforts.

The most proven method for increasing public awareness is through outreach and education. In some states where advancing regulatory or legislative programs has either been politically infeasible or not a priority, educational activities become the cornerstone of the program. For example, in Arkansas the state agency runs public service announcements of fish consumption advisories. North Carolina distributes mercury health effects pamphlets with fishing licenses. And Kentucky offers pollution prevention training for businesses and

recycling programs for households. Such efforts can increase general awareness of the mercury problem, and thus lead to increased public support for stronger measures at the state level.

If state agencies lack the initiative to educate the public on the dangers of mercury and potential solutions, then the responsibility falls to other organizations. One option for non-profit citizen organizations is to target outreach to specific populations that have the highest connection to the issue—anglers, Native Americans, expectant parents, doctors, and learning disability organizations—and build a locally-based broad coalition that can then put pressure on decision-makers. The enormous advances that Maine has made with its mercury reduction program over the past four years are due, in large part, to the committed campaign spearheaded by the Natural Resources Council of Maine and Maine Peoples Alliance. Similar effective grassroots organizing has occurred in Massachusetts led by Clean Water Action, Toxics Action Center, and Health Care Without Harm.

Like other members of the general public, decision-makers themselves may not be aware of the mercury risks and what actions they can take to reduce those risks. Similar coalition building and media exposure can help inform those in positions of political influence.

Using Public Awareness Effectively—Educating citizens is key to securing long-term commitment and funding for mercury reduction programs. If politicians perceive that the mercury problem is one that touches ordinary voters who support additional program funding, they will be more likely to take action. But if the public is not active on the issue, intense resistance to mercury reduction measures from various industry players can potentially undermine both the scope of the program and resources for implementation.

In states where there is heightened awareness among the public but the political infrastructure resistant to change, a coordinated public campaign is not only feasible but necessary to overcome either political inertia or industry opposition.

Programmatic Challenges

Maintaining Good Data

The ability to track changes in mercury uses and releases on the state level is essential for measuring the success of a reduction program. This requires developing a baseline of all mercury sources for which data are available, and maintaining an annual mercury releases inventory.

Developing a reliable baseline—Establishing a solid baseline of mercury releases is important for two reasons: It helps states design a program by identifying mercury sources that are unique to their state; and it provides a starting point against which to measure progress.

For those states that adopt percentage mercury reduction goals, such as in Minnesota or Wisconsin (where a proposed coal-fired power plant rulemaking process is underway), establishing an accurate baseline is particularly important. A baseline set earlier may have a greater likelihood of error, due to uncertainties in emissions at that time, which will then have implications for measuring progress. Minnesota is a case in point. The state agency in 2001 determined that mercury emissions were underestimated (for the paint sector) in the 1990 baseline inventory. The state concluded that its 60 percent reduction target was met ahead of schedule, and most of this was accomplished prior to 1999 mercury reduction legislation. The state agency did recommend that clearer targets be established that are not subject to the vagaries of uncertain baselines.[3]

In states where there is heightened awareness among the public but the political infrastructure resistant to change, a coordinated public campaign is not only feasible but necessary to overcome either political inertia or industry opposition.

Where the state's goal is to phase out the use of a particular product or to ban the incineration of mercury-bearing waste, baseline calculations are less critical. In these cases, baseline data would be useful mainly in indicating the overall change in the state's total mercury releases as a result of the specific program—implementation-specific data would be more relevant in measuring progress.

Maintaining Accurate Inventories—The most concrete method for measuring progress toward eliminating mercury is to measure releases and

track mercury uses. For emission sources like incinerators, compliance with emission limits is often determined by periodic stack tests or emission factors. Routine monitoring, or continuous emissions monitoring (used extensively by power plants to measure compliance with sulfur dioxide and nitrogen oxide emission limits) is more accurate, and should be instituted as part of a mercury reduction program.

The annual Toxics Release Inventory (TRI) with its revised reporting requirements will capture more information on mercury-emitting sources. While industrial sources that report to the TRI data often rely on emission factors, states can use the data to supplement the information being collected through their regulatory programs.

The biggest gap—and greatest data challenge—is accurately tracking mercury uses. States can incorporate reporting and tracking requirements in product legislation to better measure compliance with product bans or disposal bans. This may include sales disclosures, disclosures in raw material purchases and use, or manufacturer take-back requirements.

Measuring progress is not only important for assessment purposes. It also becomes a valuable communications tool—it conveys to the public the extent of the problem and can illustrate whether current efforts are adequately eliminating the problem in an appropriate timeframe.

Voluntary vs. Mandatory

Inadequacy of Voluntary Efforts—Though outreach and education are essential to mercury reduction initiatives, the assumption that outreach combined with voluntary programs will bring about significant change is often proven false. The voluntary effort carried out by King County, Washington, waste management officials with area dentists in the 1990s is a case in point. The program was initiated when staff from the local hazardous waste management program in King County noticed mercury spikes in the effluent of the main wastewater treatment plant due to dental amalgam in the sewage system. When a proposed county regulation compelling dentists to install amalgam traps failed, the local dental association agreed to help implement an education program to encourage local dentists to install traps. Dentists were provided with information about handling mercury waste, pick-up services by local waste management companies, and on-site assistance. Yet, after five years the county found that only approximately 25 out of 1,500 dentists had actually installed traps. Because the voluntary effort failed, the county mandated compliance and now requires the installation of appropriate technology to meet water quality requirements.[4]

Voluntary Efforts, A Success Story—Despite the shortcomings of voluntary programs, they have worked in some locations, usually where the scale is small enough to allow regulators or other officials to work intensively with the community. In a dental outreach program similar to King County's, the Western Lake Superior Sanitary District (WLSSD) in Duluth, Minnesota, developed an education program for dentists on best management practices. After targeting one building housing several dentists, mercury levels in the effluent decreased by over 70 percent. WLSSD followed up on this effort by creating a pilot program to install amalgam separator technologies. They also worked with medical waste contractors to set up recycling programs for the mercury waste. The Northeast District Dental Society is now involved in promoting the program, and as of spring 2002, 33 of the 50 general practices in the district have volunteered to be part of the program and have installed the advanced treatment systems. WLSSD hopes to have all dental practices in the district involved in the program by the end of 2002.[5]

Moving from Voluntary to Mandatory—Sometimes a voluntary program can serve as a pilot for a new initiative before mandating it statewide or industry-wide. The Wisconsin case study in Chapter 4 described how the success of a voluntary community-based mercury reduction program became the springboard for a state-mandated effort. The value of establishing voluntary compliance programs prior to enacting mandates can be especially high in those states where overcoming industry opposition has proven difficult. By starting with voluntary measures and evaluating participation after an initial period, advocates in and outside

government can make the case for the phase-in of mandatory measures if compliance remains low or if it's too narrow in scope.

Resistance to Change

Resistance can be encountered at all levels. Often, resistance to behavioral change within industry is linked to trying new products and processes, or implementing production changes that reduce the use of mercury-containing raw materials. Resistance is often cloaked in claims that the new technology or product is unreliable, unavailable, cost prohibitive, or incompatible with existing processes. Most often this squeamishness about new products, materials, or processes can be overcome through targeted outreach to businesses, or, more effectively, by implementing regulatory drivers to increase demand for and supply of alternative products.

Resistance to Alternative Products—In Florida, Department of Environmental Protection staff report that business consumers were reluctant to switch to low-mercury or mercury-free alternative products in different sectors because of claimed uncertainty regarding their effectiveness and quality. Problems in early production runs of some low-mercury lamps and aneroid sphygmomanometers led to resistance on the part of hospitals and businesses to purchase new equipment. A similar situation arose in dental offices, where a combination of early performance problems and lack of application knowledge among dentists slowed a program to switch from amalgam to composites. In the health sectors, further problems were created by lack of availability of alternative products through specific vendors and purchasing contracts, and by lack of equal insurance coverage for the use of newer mercury-free products.[6]

Product Performance and Availability—Time solves some of the performance problem concerns as manufacturers perfect alternative products and a new generation of business staff becomes better educated and more familiar with new products. Some states speed up this process through active education and the testing of products in pilot programs. Massachusetts has been a leader in this field, partly because of an existing infrastructure devoted to evaluating product and process changes to reduce business use and disposal of hazardous materials. In addition to vetting numerous medical alternatives, the state is currently conducting research on the effectiveness of dental amalgam separators. The state is also a leader in using statewide procurement contracts to increase the availability of alternative products. In addition, non-governmental organizations like Health Care Without Harm have actively worked to increase the availability of alternative products from vendors by negotiating directly with manufacturers.[7]

In general, though, resistance to adoption of mercury-free products often derives from reluctance to change the status quo, rather than any real shortcomings in the newer products.

In general, though, resistance to adoption of mercury-free products often derives from reluctance to change the status quo, rather than any real shortcomings in the newer products.

Obtaining Resources

No matter how ambitious a state may be in its design of a mercury reduction program, without adequate sustained funding the fruits of those efforts will likely never be fully realized.

State Allocation of Funds—A recent executive order issued in Oregon directs the Department of Environmental Quality (DEQ) to eliminate PBT releases by the year 2020. However, the legislature has not allocated any funding for DEQ to work on PBT reductions. Instead, the DEQ is supporting mercury reduction efforts through existing staff and resources, and potential cutbacks in existing programs due to budget problems may hamper further progress.[8]

Similarly, Rhode Island legislators passed a comprehensive mercury reduction bill in 2001, yet allocated no funding for the many additional responsibilities and programs environmental agency staff will have to administer to meet its requirements.

Looking for Creative Funding Sources—Supporting a large scale mercury reduction program may not involve spending general tax dollars—there are ways to fund a program without

requiring direct expenditures from state or local funds. Mechanisms which direct manufacturers to contribute to the education of the public about mercury risks (e.g., through product labeling, point-of-purchase kiosks or pamphlets), and to subsidize the collection and treatment of products at the end of their useful life, can substantially reduce government funding required to handle these toxic products. However, industry often resists such requirements, so citizen activism and the education of policy-makers is key to progress in this area.

Challenges in Finding Long-Term Solutions to the Mercury Use and Disposal Problem

As mercury reduction initiatives gather steam at the local, state, and federal levels, increasing amounts of mercury removed from industrial, commercial, and residential use will require disposal. Because mercury remains a commodity in the U.S. and globally, it is possible that some mercury collected through various initiatives could potentially find its way through resellers back into the U.S. or global markets. While on the one hand the use of recycled mercury in current products requiring the metal would be better than mining new mercury, ultimately the goal is to eliminate all uses of mercury worldwide, and retire mercury as it is removed from the marketplace. U.S. EPA and the Department of Defense (DOD) are currently reviewing long-term storage options for the large Defense Logistics Agency mercury stockpile.[9] Some advocates and policy-makers have proposed that mercury obtained through collection programs, or made available following industrial closures, be stored on an interim basis with the DOD stockpile, to ensure its safe removal from the marketplace. It is possible that some of the retirement options being considered (e.g., amalgamation or sequestration) could be applied to the increasing quantities of mercury removed from products and industrial use sectors as reduction and phaseout programs continue to expand.

Notes

[1] National Environmental Education and Training Foundation/Roper National Report Card on Environmental Attitudes, Knowledge and Behaviors, 1999.

[2] Personal communication with Charles Moore, South Carolina Department of Natural Resources, Office of Environmental Management.

[3] Minnesota Pollution Control Agency, Mercury Reduction Program: Progress Report to the Minnesota Legislature, January 2002.

[4] Personal communication with Gail Savina, Local Hazardous Waste Management Program in King County, Washington

[5] Western Lake Superior Sanitary District, *Blueprint for Mercury Elimination*; personal communication with Tim Tuominen, WLSSD

[6] Personal communication with Jack Price and Laurie Tenance, Florida Department of Environmental Protection

[7] See Massachusetts Executive Office of Environmental Affairs, Mercury Elimination, http://www.state.ma.us/envir/mercury.htm; Health Care Without Harm, http://www.noharm.org/

[8] Personal communication with Kathleen Craig, Oregon Department of Environmental Quality

[9] See Defense Logistics Agency, Mercury Management, Environmental Impact Statement, http://www.mercuryeis.com/

CHAPTER 6

Recommendations and Checklist

Introduction

What is the first step in creating a comprehensive mercury reduction program? It is helpful to start by defining what it means to have a comprehensive program. In the case of mercury, as with other persistent bioaccumulative toxic chemicals, the problem is multi-faceted. Humans have historically released substantial amounts of mercury into the environment. Mercury cycles through the environment for a long period of time and over long distances, so the releases of decades past are still with us today. And since humans continue to release mercury into the environment, we will face mercury problems in the future even if mercury use is eliminated in the near term. To address the mercury problem comprehensively means addressing past, present, and future problems: past in the form of cleaning up contaminated sites; present in the form of educating the public and stopping current uses and releases; and future in the form of expanding the scope of efforts from local to state, national, and finally global extent.

To address the long-term problem of mercury we cannot afford to have the efforts we make in the present be piecemeal.

To address the long-term problem of mercury we cannot afford to have the efforts we make in the present be piecemeal. This is not to say that small efforts are not valuable. Local programs help to build the foundation for larger efforts, but they should not be viewed as sufficient by themselves. Along similar lines, end-of-the-pipe reductions may solve some of the present mercury problems, but they have limited impact in terms of reducing the amount of mercury entering the waste stream. A key component to solving present mercury problems, and then decreasing and eventually eliminating future problems, is to get mercury out of products and processes. To ensure that the greatest impact is made, existing mercury-containing products should be taken out of the waste stream before they end up broken, incinerated, or landfilled.

The National Wildlife Federation, with guidance from experts in the toxics reduction field, offers the following criteria to serve as both a model to build comprehensive programs and an assessment tool for existing initiatives. The checklist below is designed for use by agency staff or citizen advocates and includes a series of questions under each criterion to help identify the different steps involved in fully meeting these criteria.

Program Criteria

Education is paramount to creating momentum for change: you need to raise awareness of the problems related to mercury uses and releases, propose solutions and present opportunities for eliminating the problem.

1. Lifecycle Approach: When considering development of a mercury reduction program, it is essential to look at the entire mercury lifecycle from supply, design and production, to consumer purchase and use, and finally to disposal/reuse or retirement. A comprehensive program should address as many of the phases as is feasible. To maximize reductions for many mercury products, a two-pronged approach is required—removing or minimizing mercury use in production, and capturing mercury from used products before it enters the waste stream. To create lasting change, the emphasis should be on use reduction in the design and production phase to stem the flow of mercury into the system, and reduce opportunities for mercury releases.

2. Accountability: Any mercury reduction effort must begin with a reliable baseline, followed by an annually updated inventory and a routine monitoring program that tracks releases into the environment and mercury uses. The next step in developing either a mandatory or voluntary program is goal setting, accompanied by reporting and evaluation during, or at the completion, of the program. Finally, the results of the program must be measured and verified to establish credibility and level of effectiveness. The purpose of developing accountability in a program is to ensure that reductions are, in fact, made. Voluntary programs should be reinforced with a formal agreement like a Memorandum of Understanding, the development of government 'procedures' or other non-binding mechanisms, and continued public or political pressure. Where mandatory programs are established, using the hammer of the law may increase the effectiveness of mandatory programs, as long as enforcement mechanisms are understood, their consequences are significant and their use is publicized.

4. Education: Education is paramount for creating momentum for change: a program should raise awareness of the problems related to mercury uses and releases, propose solutions and present opportunities for eliminating the problem. The three main targets for educational programs are individuals and business consumers, the producers of mercury-containing products or industries otherwise releasing mercury to the environment, and decision-makers (on the local, state, or national level). Educational components come in a variety of forms, from public awareness campaigns such as on fish advisory outreach or product disposal guidelines to industry training workshops to legislative testimony. A number of states are also working to enact legislation requiring direct labeling of mercury-containing products to provide point-of-purchase and point-of-disposal information to consumers.

5. Commitment of Resources: A binding commitment of resources is essential to ensure that a program will continue until it has produced the desired results. Carefully thought-out and implemented programs can be substantially impaired by lack of funds and/or staff time. Evaluation of existing and potential resources is an essential part of the planning phase of a program, as is creativity in finding alternate sources for program funding beyond general tax revenues (e.g., producer responsibility, user fees, etc.). Another key element for program survival and success is decision-maker support and commitment to achieving results. The level of support required for program success depends on the scope of the initiative. A successful program has the potential to expand as the attention of higher level decision-makers becomes engaged. However, high-level support from the start helps to create a solid foundation for the program, and promotes long-term viability.

Checklist

Sectors to Consider:

- Mercury production
- Mercury chemical dealers and re-sellers
- Manufacturers of mercury products, and/or manufacturers using mercury in the production process or emitting mercury found in raw material (e.g., coal burned to generate electricity)
- Dental sector—largest users and disposers of mercury compounds in many settings
- Retailers and wholesalers selling mercury products
- Consumers—both the public at large and institutions
- Mercury recyclers/disposal companies
- Long-term mercury storage

Questions to Consider:

PROGRAM SET-UP

- What is the program designed to achieve?
- What resources are needed to complete each task? (Make sure you include resources needed to collect and analyze performance data and provide status reports).
- What barriers or other situations could increase the need for further resources, and what more would be needed if those things happened?
- Who is responsible for coordinating efforts and ensuring all participants carry out their assigned tasks?
- Is support needed from key decision makers? How will this support be won? What resources are needed to win this support?
- Have you identified potential opposition to the program? Have you planned methods to work with such opposition to ensure program success?
- What level of authority is needed to accomplish the various tasks in this project? Do participants have this authority?

PROGRAM IMPLEMENTATION

- What flexibility/requirements exist to alter program features if the program is not succeeding or succeeds beyond expectations?
- Have you created a budget that includes necessary financial and human resources?
- If current resources are insufficient are there opportunities to develop needed resources?
- If needed resources are not available, have you planned methods to scale back the project to a supportable level?
- What incentives exist to insure comprehensive follow-through?

PROGRAM RESULTS

- Is information available to create a baseline for measuring future success?
- What are the measures of success?
- How will the results be measured?
- What data needs to be collected?
- How will the data be collected and verified?
- What type of agreement exists between parties in a multi-project partnership? Memorandum of Understanding? Informal agreement?
- What is the process for redress if one or more parties do not live up to the agreement?
- If all parties carry out their responsibilities yet the program is not as effective as hoped, do you have commitments to pursue additional measures to achieve the desired result?
- If the program is more successful, or more quickly successful, than anticipated, is there a mechanism for strengthening the program goals?

EDUCATION/OUTREACH

- Who is the target audience? If more than one audience, consider the differences in the audiences and if different educational goals and methods are required.
- What behavior change are you striving for?
- How does your target audience like to get information?
- Does your message address why people should care and how they can change their behavior on a level that appeals to the target audience?
- Have you designed your message to appeal in part to self-interest rather than assuming your audience will act out of altruism alone?
- What are the influences and competition that the program is dealing with?
- How will the results of the program be measured? (Measured results could include percentage of target population reached, or retention of information, but the primary goal should be measurable changes in behavior.)
- Is your education effort long-term and sustained? Do you have sufficient resources over the long term?

CHAPTER 7

National, Regional, and State Mercury Resources

Below are a number of web sites where you can obtain more information about national and state policy, human health and ecological impacts, and mercury sources.

Local and national non-governmental organizations have been instrumental in advancing a policy agenda that calls for the elimination of mercury-bearing products and waste. To learn which organizations are active in your state and join a national network of mercury advocates, contact either the National Wildlife Federation, Mercury Policy Project, or the State Environmental Leadership Program (www.selp.org).

National

Organization	Description	Web Site
Environmental Protection Agency	Links to Hg reduction strategies, general info and frequently asked questions	www.epa.gov/mercury http://www.epa.gov/r5water/npdestek/npdmerc.htm
Environmental Protection Agency	Listing of Fish and Wildlife Advisories; National Fish and Wildlife Contamination Program	http://map1.epa.gov/ http://www.epa.gov/ost/fish
Agency for Toxic Substances and Disease Registry	Toxicological information about mercury	http://www.atsdr.cdc.gov/tfacts46.html
U.S. Food and Drug Administration	Consumption advice on commercially bought seafood.	http://www.fda.gov/bbs/topics/ANSWERS/2001/advisory.html
National Atmospheric Deposition Program	National database of mercury concentrations in precipitation	http://nadp.sws.uiuc.edu/mdn/
Mercury Policy Project	Promotes policies to eliminate Hg use and reduce Hg impacts	http://www.mercurypolicy.org/
Environmental Council of States	Includes contact information and links to 52 state and territory environmental agency sites	http://www.sso.org/ecos/projects/projects.htm
Mercury in Schools	Clearinghouse for info on Hg is schools. Supports training for teachers	http://www.mercury-k12.org/
Association of Metropolitan Sewerage Agencies	Report: Evaluation of domestic sources of mercury	http://www.amsa-cleanwater.org/pubs/mercury/mercury.cfm
Mercury in Buildings	Resource for Hg content in buildings, and how to manage existing Hg and reduce further use	http://Abe.www.ecn.purdue.edu/~mercury/src/title.htm

National, continued

Organization	Description	Web Site
Pollution Prevention Resource Exchange	Network of regional centers disseminating information to services providers	http://www.p2rx.org
National Pollution Prevention Roundtable	Provides national forum for promoting efforts to avoid, reduce or eliminate pollution	http://www.p2.org

Regional

Organization	Description	Web Site
Northeast Waste Management Officials' Association (NEWMOA)	Regional org that coordinates interstate hazardous and solid waste, and pollution prevention programs. Maintains national database tracking states' mercury programs.	http://www.newmoa.org/Newmoa/htdocs/prevention/mercury/
Binational Toxics Strategy	Strategy for the virtual elimination of mercury	http://www.epa.gov/Region5/air/mercury/mercury.html
New England Governors and Eastern Canadian Premiers (NEG/ECP)	Mercury Action Plan Regional Progress Report	http://www.cmp.ca/neg/reports/mercury.htm http://www.newenglandgovernors.org/environment.html
Western Regional Pollution Prevention Network	Researches and disseminates pollution prevention information in four western states	http://www.westP2net.org

Automotive

Organization	Description	Web Site
Auto Mercury Switch Removal	Resource for automotive switch removal and replacement	http://www.epa.gov/Region5/air/mercury/autoswitch.htm http://www.epa.gov/glnpo/bns
Ecology Center	Resources for links to auto Hg reduction programs	http://www.ecocenter.org/auto.shtml
Clean Car Campaign	Nonprofit campaign promoting development of clean motor vehicles	http://www.cleancarcampaign.org

Healthcare

Organization	Description	Web Site
Healthcare Without Harm	Promoting comprehensive pollution prevention practices and reform in healthcare	http://www.noharm.org/index.cfm
Hospitals for a Healthy Environment	Program that help hospitals enhance work place safety, reduce waste and waste disposal costs	http://www.h2e-online.org/
Sustainable hospitals	Provides hospitals technical support on a range of environmental and occupational issues	http://www.sustainablehospitals.org/cgi-bin/DB_Index.cgi
Preventive Dental Health Association	Information on alternatives to mercury fillings	http://emporium.turnpike.net/P/PDHA/mercury/fillings.htm

State Mercury Web Sites

Note: For additional state links, go to www.sso.org/ecos

Organization	Description	Web Site
Colorado Pollution Prevention Program	Pollution prevention education and training	http://www.coloradop2.org/cop2p.htm
Connecticut Dept of Environmental Protection	Pollution prevention program	http://dep.state.ct.us/wst/p2/
Delaware Dept of Natural Resources	Hazardous Waste information	http://www.dnrec.state.de.us/DNREC2000/ divisions/awm/hw/indexhw.htm
Georgia Department of Natural Resources, Pollution Prevention Assistance Division	Mercury—Aren't You Curious?	http://www.state.ga.us/dnr/p2ad/mercury.html
Indiana Department of Environmental Management	Mercury information and programs	http://www.in.gov/idem/mercury/
Maine Dept of Environmental Protection	Mercury Resources	http://www.state.me.us/dep/oia/ http://www.state.me.us/dep/mercury/index.htm
Maryland Dept of the Environment	Facts About Mercury	http://www.mde.state.md.us/was/hazcleanup/mercury_fs.htm
Massachusetts Department of Environmental Protection	Mercury Resources	http://www.state.ma.us/dep/bwp/hgres.htm http://www.state.ma.us/envir/mercury.htm
Michigan Department of Environmental Quality	Mercury Pollution Prevention Topics	http://www.deq.state.mi.us/ead/p2sect/mercury/
Minnesota Pollution Control Agency	Special Pollutant: Mercury	http://www.pca.state.mn.us/air/mercury
New Jersey Dept of Environmental Protection	Mercury Task Force	http://www.state.nj.us/dep/dsr/mercury_task_force.htm
New Hampshire Dept of Environmental Services	Waste Management Services Pollution Prevention Program - Mercury	http://www.des.state.nh.us/nhppp/mercury.htm
New York State Dept of Environmental Conservation	Mercury Management in New York State	http://www.dec.state.ny.us/website/dshm/redrecy/mercury.htm
North Carolina Division of Pollution Prevention and Environmental Assistance	Health impacts of mercury; pollution prevention in schools, households	http://www.p2pays.org/mercury
Ohio Environmental Protection Agency	Mercury collection, recycling reduction activities	http://www.epa.state.oh.us/opp/mercury_pbt/mercury.html
Pennsylvania Dept of Environmental Protection	Mercury Toxic, Persistent, Preventable	http://www.dep.state.pa.us/dep/ deputate/pollprev/p3erie/hs~mercbroch.htm
Rhode Island Dept of Environmental Management	Pollution Prevention Program	http://www.state.ri.us/dem/programs/benviron/assist/pollut.htm
Vermont Agency of Natural Resources	Mercury Education & Reduction Campaign	http://www.anr.state.vt.us/dec/ead/mercury/merc.htm
Virginia Dept of Environmental Quality	PBTs Office of Pollution Prevention	http://www.deq.state.va.us/sara3/pbt.html http://www.deq.state.va.us/p2/
Wisconsin Department of Natural Resources	Environmental Protection—Mercury	http://www.dnr.state.wi.us/org/caer/ce/mercury/

APPENDIX A

Summary of Nationwide Mercury Efforts

[Reprinted with permission. Draft Mercury Report, October 10, 2001. Hazardous Waste Management Program, Department of Toxic Substances Control, State of California.]

This appendix is a compilation of nationwide efforts regarding mercury as they apply to products, bans or restrictions on mercury-containing products, any state laws or regulations specific to mercury, mercury-containing waste and voluntary and other efforts of interest. It is not to be considered a comprehensive compilation of all applicable state laws and regulations regarding mercury. Sources to compile this summary were the states' websites with follow up telephone calls by the original authors to states for clarification or additional information.

State	Statutes / Regulations	Proposed Legislation	Other Efforts
AR		None	Pamphlets/brochures describing mercury problem. Fish consumption advisory pamphlets. Television public service announcements. Fish flesh monitoring program.
CA	•Prohibited sale of Zinc Carbon, Alkaline Manganese batteries, and Alkaline batteries greater than .025% mercury by weight. • Prohibited sale of mercuric oxide batteries • Prohibited manufacturing, exchange, and sale of toys containing soluble compounds of mercury.	SB 633 would prohibit any person from selling or supplying mercury fever thermometer except by prescription. Prohibits manufacturing, sale, or distribution of mercury-added novelties. Prohibits any school form purchasing specified materials and devices containing mercury. Encourages but does not mandate the removal of mercury-containing switches from vehicles, once removed switches must be managed as hazardous waste, and prohibits the sale of vehicles manufactured on or after January 1, 2005 that contains a mercury-containing motor vehicle light switch.	• Guide to Mercury Assessment and Elimination in Healthcare Facilities. • Fish consumption advisories printed in the California Sport Fishing Regulations booklet and updated by OEHHA.
CT	• Adopted .028 mg/dscm emission limitation for municipal waste incinerators. • Mercury-containing lamps added to Universal Wastes.	HB 5179 bans sale of mercury thermometers. • HB 5181 discourages disposal of mercury containing products. • HB 6197 would regulate mercury products and mercury emissions. • HB 6687 restricts the sale of products with mercury.	Commercials on mercury and thermometer exchanges. • Goal of 2001 pounds of mercury collected by end of year 2001. • Conducted fish tissue monitoring from 1995 to 1999. • 3 years of atmospheric mercury monitoring. • Study sources and cycling of mercury in
DE	Surface Water Quality Standards specify criteria for human health as well as protection of aquatic life.	None	• Delaware 2000 Fishing Guide lists fish consumption advisories.
FL	Mercury-containing electrical devices such as thermostats, mercury switches, relays, thermometers, manometers, ampoules, and lamps are prohibited from being disposed of in landfills or incinerated, does not include batteries or lights. Separated glass from mercury-containing lamps may not be incinerated or used in food and beverage containers.	None	
GA	• Regulates air releases from sewage sludge, medical waste, municipal incinerators and one chlor-alkali plant. • "Risk reduction" standards created for superfund sites soil and water. • Water Protection Branch has health based water quality criteria and permits for several industries.	None	Fish consumption guidelines released each year and posted on EPD website (www.~anet.orn/dnr).
IL		None	Has ongoing education outreach about fish advisories to women of childbearing age throughout the state • Outreach programs as well as exchanges have taken place in the past. There has also been free mercury recycling programs in the past

State	Statutes / Regulations	Proposed Legislation	Other Efforts
IN	HB1901 Prohibits the sale and distribution of most mercury-added novelties. Limits circumstances under which mercury fever thermometers may be sold or supplied to individuals. Restricts public and nonpublic school from using or purchasing a mercury commodity, mercury compounds, or mercury-added instructional equipment and materials. Provides that a person may sell or provide a thermometers. Prohibits schools from purchasing mercury or mercury compounds. Manufacturers must provide a certificate of mercury content to hospitals upon request.	(HEA 1967 would ban mercury thermometers and novelties. Would also prohibit the use of elemental mercury in schools.	
MD	• HB 75 prohibits selling or distributing mercury fever thermometers except under specified circumstances beginning October 1, 2002. • Prohibits primary and secondary schools from purchasing elemental or chemical mercury beginning October 1,2003. • Department of the Environment required to provide outreach to schools on proper management recycling, and disposal of mercury and mercury-added products	None	
MA	• NEG and ECP Mercury Action Plan calls for elimination of mercury emissions with 50% reduction by 2003. • 1999 adopted emission limit of 28ug of mercury per dry standard cubic meter for Municipal Solid Waste Combustors.	• HB 1555 Bans the use of mercury in public schools • HB 2217 Restricts sale and use of products containing mercury • HB 3772 Regulates the sale of mercury thermometers • Considering an emissions limit of 28ug per dry standard cubic meter for Medical Waste Incinerators.	Collection of bulk elemental mercury from dental offices. • Mercury thermometer collection and replacement project. • Municipal Assistance Program includes subsidized statewide contract to reduce the costs of pickup and recycling. • Outreach to dentists, fisherpeople, and pregnant women. • Other projects including "clean sweep"
MI	• 1999-2000 legislation to phase out mercury use in school classrooms by 2004. • Permits required for discharge directly to waters of the state. • Adopted Universal Waste rule in 1996 for batteries, thermostats, switches, thermometers, and any waste device containing only mercury as the hazardous waste constitute	• HB 4599 prohibits the sale of mercury thermometers. • SB 6 requires hospitals to not use mercury after December 31, 2005 unless no mercury-free alternatives are available	• Many mercury pollution prevention activities have been implemented • University of Michigan received 1.3 million dollars in 1996 to conduct mercury-monitoring program in the Lake Superior Basin. • 1998 citizens passed the Clean Michigan Initiative, a $675 million bond to clean up, protect, and enhance Michigan's environmental quality that included mercury assessment activities such as collecting and analyzing Bald Eagle blood and feather samples for mercury and other bioaccumulative chemicals.

State	Statutes / Regulations	Proposed Legislation	Other Efforts
MN	• Disposal of mercury containing thermostat, thermometer, electrical switch, appliance, gauge, medical or scientific instrument, or electrical relay into solid waste or wastewater system is prohibited • A person may not sell mercury to another person without providing a material safety data sheet and having signed statement. • Manufacturer may not sell thermostat, thermometer, electrical switch, appliance, medical or scientific instrument, or electrical relay without labeling clearly that the product may not be placed in the garbage until the mercury is removed and managed to ensure it does not become part of the waste. • Toys, games, apparel, and manometers_are_banned. • 1995 adopted emission standards for medical infectious waste incinerators.	HF 274 and SF 70 prohibit the sale of mercury thermometers.	• Developed a web site 2 years ago after the Mercury Contamination Reduction Initiative. • Developing TMDLs for two watersheds • Minnesota will continue to research environmental effects of mercury
MO		None	Maintainedeffo~stomonitorformercurybut has not increased its efforts.
NE		LB 40 prohibits the sale of mercury thermometers.	
NH	• Set emissions limit of 0.028 mg/dscm for municipal waste incinerators • Banned mercury thermometer sale without prescription • Banned sale of novelty items • Prohibits mercury use in k-12 classes • Restricts sale of elemental mercury to a few specific purposes. • Manufacturers of mercury-added products, such as fluorescent lamps, batteries, thermostats, and electrical switches must notify the state about how much mercury is contained in their products. • Banned disposal of mercury oxide batteries.	• HB 655 Establishes advanced disposal fee to fund local mercury presorting and recycling programs. • HB 675 Covered the reduction of mercury in products.	• Mercury reduction workshops for hospitals. • Developing mercury collection and recycling program with NH Dental Society. • Established a contract to collect and recycle all the state agencies fluorescent lamps. • Ecowatch television commercial describing the hazardous nature of mercury and proper management. • Promoted thermometer exchange program. • Collection and sampling of freshwater fish.
NJ	• Banned the sale of consumer mercury oxide batteries • Limits mercury emissions to 28ug/dscm from municipal solid waste incinerators	A 3250 and S 2315 both ban the sale of mercury thermometers.	• Universal Waste Rule for fluorescent lamps, mercury switches, gas regulators, and thermometers. • Funding for demonstration projects to collect and recycle mercury-containing products. • Distribution of 10,000 copies of "A Woman's Guide to Eating Fish and Seafood" to NJ health clinics. • Numerous research projects.
NM	No discharge of mercury to landfills	None	• Fish tissue studies. • Monitoring of known mercury sources such as abandoned mines.

State	Statutes / Regulations	Proposed Legislation	Other Efforts
NY	• Pretreatment and source control programs. • Adopted federal emission limits for medical waste incinerators and municipal waste combustors. • Limit of loppm for land application of sludge and compost.	AB 4209 and SB 3084 are the same bill that would phase-out mercury-added products. They include disposal prohibition, labeling requirements, source separation, requirements for sewage treatment plants, point source release containment traps, and ban the sale of certain products. Also require the replacement of manometers and gas pressure regulators, regulates dental use and bans health insurance discrimination, requires lamp recycling, and adds all mercury-added products to state universal waste rules.	• Mercury-containing batteries, fluorescent lamps and other mercury-containing products are included in many household hazardous waste collection programs. • Several research and monitoring programs are in place mercury as well as other chemicals
NC	Air emissions and water discharges are limited	None	• Fish consumption advisories posted at boat launches. • Pamphlets explaining risk of consuming contaminated fish are distributed with fishing licenses. • Research to identify and characterize North Carolina impaired waters.
OH	MACT Program and permit system to assure compliance with Federal mandates.	None	• Bulk mercury collection program for dental offices and education efforts. • Other mercury reduction projects are being created. • Monitoring efforts includes a plan to collect ambient mercury data in the south Great Lakes area.
OR	2001 HB 3007 passed and was signed into law. Prohibits sale of mercury thermostats, fever thermometers, mercury-added novelties and motor vehicles containing mercury light switches. Prohibits installation of mercury thermostats with exception. Calls for removal of all mercury light switches from state-owned vehicles.	SB 903 Creates task force to conduct or sponsor research to address possession of hazardous substances, including mercury waste.	
RI	• 2000 established a 0.055 milligrams per dry standard cubic meter emission rate for hospital, medical, and infectious waste incinerators. • 2001 SB 153 banned the sale of mercury containing fever thermometers except with a prescription.	HB 6161 and SB 661 prohibit landfill disposal of mercury and provide for the collection and proper handling of mercury. • SB 649 encourages establishment of effective waste reduction, recycling, management, and education programs.	Thermostat recycling take-back programs. • Fish advisories issued through the Department of Health (www.health.state.ri.us/000406a.htm)
SC	Water quality standards for mercury in streams	None	• Fish consumption advisory information issued annually. • Collect and analyze a minimum of 1500 fish samples a year.
SD	Surface water discharge permits.	None	• Bitter Lake Fish Consumption Advisory. • Research on ambient surface water quality near mining point sources.

State	Statutes / Regulations	Proposed Legislation	Other Efforts
TE		None	• Water and fish tissue monitoring have been practiced. • Fish advisories limiting consumption or in some cases "do not consume" advisories are issued when needed
TX	Regulatory efforts in Texas include standards for drinking water, surface water, land application, and risk reduction	HB 3085 regulates the sale and use of products containing mercury.	• Collection and recycling programs. Online guide to businesses that handle mercury • Wastewater pretreatment assistance. • Various research projects and programs
VT	• Manufacturers and wholesalers may not sell mercury containing thermometer, thermostat, medical instrument, scientific instrument, switch, lamp, or battery unless it is labeled as a mercury-added product (1999). • Labeled mercury-added consumer products prohibited from being disposed of in solid waste landfills. • Advisory committee on mercury pollution formed.	(HB 283 Establishes advanced disposal fee for certain mercury-added products (8% of wholesale price) • SB 91 Bans sale of thermometers, dairy manometers, and novelties with mercury. Bans some uses of mercury in schools and the disposal of mercury in landfills and incinerators. Requires separation of mercury containing products prior to disposal or recycling. Requires manufacturers to report the amount of mercury in products.	• Laboratory chemical clean outs. • Voluntary pledge programs for pharmacies to not sell mercury thermometers. • Mercury thermometer exchange program. • Training for reduction of mercury-added hospital products. • Consumption advisories on fresh and salt waster fish.
VA		None	• Dental mercury sweep collection and recycling. • School sweep collection and phase out
WI	• Surface water criterion. • Emissions	• NR 446 limits mercury emissions from coal burning plants and industrial operations that have mercury emissions of more than 10 pounds a year. 90% reduction over 15 years. • A bill reducing mercury in products is also being drafted.	• Thermostat exchanges. • School collections. • Dairy manometer exchange program. • Mercury reduction workshops • Numerous monitoring efforts are used
US	HR 2024/Public Law No. 104-142 banned the sale of zinc carbon, mercury-oxide, and alkaline-manganese batteries with intentionally introduced mercury. Also banned the sale of Alkaline-Manganese button batteries containing more than 25 milligrams per button battery.	• S 351 bans sale of mercury fever thermometers and sets up a task force to research the collection and permanent retirement of mercury. • S 555 requires the Secretary of Health and Human Services to establish a tolerance for the presence of methylmercury in seafood. • HR 2266 reduces risk of accidental release of mercury into the environment by providing temporary storage of private sector mercury supplies at facilities of the Department of Defense that are currently used for mercury storage. It also requires the Administrator of the Environmental Protection Agency to appoint a task force to develop a plan for the safe disposal of mercury.	