Massachusetts
Zero Mercury Strategy

Table of Contents

APPENDICES

List of Abbreviations

AHA	American Hospitals Association
BEHA	DPH Bureau of Environmental Health Assessment
CAN	Clean Air Now
CEF	Clean Environment Fund
DEP	Massachusetts Department of Environmental Protection
DFWELE	Massachusetts Department of Fish, Wildlife and Environmental Law Enforcement
DPH	Massachusetts Department of Public Health
dscm	dry standard cubic meter
ECP	Eastern Canadian Premiers
EOEA	Massachusetts Executive Office of Environmental Affairs
EPA	US Environmental Protection Agency
EPP	environmentally preferable product
FDA	US Food and Drug Administration
H2E	Hospitals for a Healthy Environment
HHP	hazardous household product
MASCO	Medical Academic and Scientific Research Organization, Inc.
MASSPIRG	Massachusetts Public Interest Research Group
MDS	Massachusetts Dental Society
MWC	municipal waste combustor
MWI	medical waste incinerator
MWRA	Massachusetts Water Resources Authority
NEGC	New England Governors' Conference
NESCAUM	Northeast States for Coordination of Air Use Management
NEWMOA	New England Waste Management Officials Association
NPPR	National Pollution Prevention Roundtable
OSD	Massachusetts Operational Services Division
OTA	EOEA Office of Technical Assistance
P2	pollution prevention
PBT	persistent bioaccumulative toxin
POTW	publicly owned treatment works
RMTF	Regional Mercury Task Force
SHP	UMass Lowell Sustainable Hospitals Project
STEP	Massachusetts Strategic Envirotechnology Partnership
TRAC	MWRA Toxic Reduction and Control Department
TRC	Thermostat Recycling Corporation
TRI	EPA Toxics Release Inventory
TURA	Massachusetts Toxics Use Reduction Act
TURI	Massachusetts Toxics Use Reduction Institute
ug	microgram
UMass	University of Massachusetts
USGS	US Geological Survey

EXECUTIVE SUMMARY

Massachusetts state agencies have focused on mercury as an environmental concern since the early 1990's. In 1998, Governor Paul Cellucci, along with the other New England Governors and the Eastern Canadian Premiers, adopted a Regional Mercury Action Plan. The goal of the Regional Mercury Action Plan is the virtual elimination of the release of anthropogenic mercury with an interim goal of a 50 percent reduction in emissions by 2003, based on a 1996 inventory of emission sources. In September 1999, Environmental Affairs Secretary Bob Durand initiated a Massachusetts Mercury Task Force composed of executive agency staff. The purpose of the Task Force was to build on existing efforts and develop a coordinated, multi-media strategy for achieving the virtual elimination of both the use and release of mercury attributable to human activities in Massachusetts.

The Task Force has developed a Zero Mercury Strategy. The goal of the Zero Mercury Strategy differs slightly from that of the Regional Mercury Action Plan: the virtual elimination of both the use and release of anthropogenic mercury. In addition, because Massachusetts expects to meet or exceed the interim goal of a 50 percent reduction in emissions by 2003, a second interim goal has been set: a 75 percent reduction in emissions by 2010.

The Zero Mercury Strategy considers three main areas: possible actions to reduce or control sources of mercury releases in Massachusetts; outreach and education; and research and monitoring. The five categories of sources for which recommendations were developed include: products containing mercury, medical and dental facilities, waste facilities, utilities, and industry. Other sources are considered in the research and monitoring strategy. Ongoing, planned and recommended efforts are summarized in Executive Summary Table 1. The Education and Outreach strategy lays out an education message with outreach channels for six "populations of special concern," those most likely to be affected by elevated levels of mercury exposure, and 13 populations and institutions. The populations addressed are listed in Executive Summary Table 2. The Research and Monitoring Strategy identifies research activities in four areas: general research, sources, sinks and fate and transport, and is summarized in Executive Summary Table 3.

Recommendations for action to reduce or control sources of mercury include both pollution prevention techniques and emission and discharge controls, with the emphasis on pollution prevention. The types of action discussed include the full range of those available to executive agencies: review of regulations, technical assistance to the regulated community, collaborative efforts with outside government agencies, industry and non-profit organizations, and support of legislation.

The Mercury Task Force will continue to meet on a regular basis to coordinate implementation of the Strategy, set priorities for new work, and assist in procuring resources where necessary. A Mercury Policy Advisory Committee will be created to provide stakeholders an ongoing mechanism to provide input on the Strategy's implementation.

Executive Summary Table 1:
ONGOING, PLANNED AND RECOMMENDED EFFORTS TO REDUCE SOURCES OF MERCURY

1. Products Containing Mercury	
Ongoing Efforts	• Development and support of mercury products legislation
	• Hazardous household products collection programs
	• State purchasing initiatives
	• Product stewardship programs
FY 2001 Planned New Activities	• Expand efforts toward passage of mercury products legislation
	• Expand product stewardship programs
Additional Recommended Action	• Expand hazardous household collection programs
	• Promotion of environmentally preferable products
	• Clean sweeps
Action Requiring Additional Evaluation	• Review of State Regulations
	• Develop incentives to make non-mercury products economically attractive
2. Medical and Dental Facilities	
Ongoing Efforts	• MWRA-MASCO Work Group (completed)
	• DEP waste audit of hospitals
	• UMass Lowell Sustainable Hospital Project
	• OTA ongoing technical assistance to medical facilities
	• Health Care Environmentally Preferable Purchasing Roundtable
	• Health Care Environmentally Preferable Information Exchange Newsletter
	• MWRA-DEP outreach and education to dentists
FY 2001 Planned New Activities	• Expand efforts toward passage of mercury products legislation
	• Development of a searchable web-based database of trace mercury test results for chemicals used in medical facilities
	• Collection of bulk elemental mercury from dental offices
	• Encourage the adoption of amalgam separation technology for dentists in MWRA service district
Additional Recommended Action	• Establish and/or promote reward program for medical facilities
	• Work with insurance companies to fully cover non-mercury fillings
	• Work with Mass. Dental Society to provide education to practicing dentists and dental schools on the performance and costs of alternatives to mercury amalgam
	• Work with the Mass. Dental Society to encourage all dentists in the state to install amalgam separation technology and ensure the proper disposal/recycling of collected mercury-bearing wastes
Action Requiring Additional Evaluation	• Explore opportunities to develop financial incentives for hospitals to purchase mercury-free equipment through tax credits or other mechanisms
	• Require hospitals to implement mercury reduction plans as part of DPH licensing requirements
	• Establish voluntary takebacks with credit for mercury-free replacements for medical equipment containing mercury
	• Expand spill response education and enforcement

3. Waste Facilities	
Municipal Waste Combustors	
Ongoing Activities	• The Municipal Waste Combustor Rule requires facilities with capacity of greater than 250 tons/day meet a mercury emissions standard of 28 ug/dcsm. The compliance deadline for the emissions standard is December 2000. Facilities must also develop materials separation plans for products containing mercury.
FY 2001 Planned New Activities	• DEP will review and approve materials separation plans, which will be submitted July 2000.
Medical Waste Incinerators	
Ongoing Activities	• Development of Medical Waste Incinerator Rule
FY 2001 Planned Activities	• Promulgation of Medical Waste Incinerator Rule
Action Requiring Additional Evaluation	• Require hospitals to implement mercury reduction plans as part of DPH licensing requirements
POTW's and Sewage Sludge Incinerators	
Ongoing Activities	• EPA National Pre-treatment Program • MWRA prohibition on mercury discharges from industrial sources
Recommended Action	• Identify and implement strategies to reduce mercury in POTW effluent and residuals
	• Increase capacity building efforts to assist municipalities in reducing mercury levels at POTW's
	• Promote cooperative partnerships with POTW's and Mass. Dental Society
	• Work with local boards of health to reduce discharges to septic systems
4. Utilities	
Ongoing Efforts	• Adoption of multi-pollutant regulations for coal-burning power plants to significantly reduce mercury emissions • Some coal-burning power plants will be switching to CNG
5. Industry	
Ongoing Efforts	• Consideration of changes to the Mass. Toxics Use Reduction Act (TURA) that would require a greater emphasis on potentially bioaccumulative toxins
Recommended Action	• With increased data on mercury use as a result of changes to the Toxics Release and TURA reporting thresholds, the TURA program should focus more resources on mercury.
6. Recommendations to the Legislature	• Pass a comprehensive Mercury Products Bill • Increase funding to the Clean Environment Fund to $10.2 million for FY 2001

Executive Summary Table 2
POPULATIONS FOR EDUCATION AND OUTREACH

1. Populations of Special Concern	
• Pregnant women	• Children; elementary and secondary schools
• Women of childbearing age	• Fishermen
• Parents of young children	• Cultural users of elemental mercury

2. Populations and Institutions for Education and Outreach	
• General public	• Office building and facility managers
• Medical community	• HVAC contractors, suppliers and wholesalers
• Dental community	• Corporate environmental managers
• Community health centers and social workers	• Plumbers and electricians
• Municipal officials and local boards of health	• Dismantlers of cars and white goods
• Building inspectors	• Wildlife advocates
• Universities	

Executive Summary Table 3:
RESEARCH AND MONITORING STRATEGY

	Project	**Status**
1. GENERAL RESEARCH	New England Goals and Indicators Project	Ongoing, expanded efforts would require additional support
	Coordinate mercury research and activities in Massachusetts	Ongoing, expanded efforts would require additional support
	Mercury Strategic Research Program	Proposed, short term
	Survey ongoing research and monitoring efforts for opportunities to expand current scope to include mercury	Proposed, short term
2. SOURCES OF MERCURY		
ESTABLISH BASELINES AND TRENDS	Mercury release sources	
	• Quarterly monitoring of municipal waste combustors	Ongoing
	• Publicly Owned Treatment Works (POTW's)	Ongoing, expanded efforts would require additional support
	• Direct discharges from hospitals, laboratories, dentists and federal facilities	Ongoing, expanded efforts would require additional support
	• Septage	Ongoing, expanded efforts would require additional support
	• Annual monitoring of medical waste incinerators	Planned
	• Annual monitoring of sludge incinerators	Proposed, short term
	• Ash from coal burning utilities and municipal waste combustors	Proposed, long term
	• Landfills	Ongoing in other states
	• Dismantlers, Secondary Smelters	Ongoing in other states
	• Crematoria	Ongoing in other states
	• Veterinary uses	Ongoing in other states
	• Wood burning stoves	Ongoing in other states

	Project	Status
ESTABLISH BASELINES AND TRENDS, con't	Update the inventory of mercury release sources in Massachusetts	Planned, short term
	Collect baseline data on amount of mercury in products and processes	Ongoing, expanded efforts would require additional support
	Create database of mercury and products containing mercury being recycled	Ongoing, expanded efforts would require additional support
	Survey of mercury in hospitals	Proposed, short term
	Analyze improved TURI data	Proposed, long term
DEVELOP OR PROMOTE METHODS TO ELIMINATE AND REDUCE THE USE AND RELEASE OF MERCURY	Alternative products	Ongoing, expanded efforts would require additional support
	Research green chemistry	Ongoing, expanded efforts would require additional support
	Evaluate emission limits for remaining mercury sources, including sludge incinerators	Ongoing, expanded efforts would require additional support
	Development of alternative technologies for hazardous waste site remediation	Ongoing, expanded efforts would require additional support
	Process redesign	Proposed, long term
3. SINKS FOR MERCURY		
ESTABLISH BASELINES AND TRENDS FOR ENVIRONMENTAL RECEPTORS	NOAA Status and Trends Program- Musselwatch	Ongoing
	Gulfwatch Program	Ongoing, expanded efforts would require additional support
	USGS National Water Quality Assessment Program	Ongoing
	MWRA Outfall testing of fish tissue	Ongoing
	Interagency Committee on Fish Toxics Monitoring and Assessment	Ongoing, expanded efforts would require additional support
	DEP Atmospheric deposition monitoring stations	Ongoing, expanded efforts would require additional support

	Project	Status
ESTABLISH BASELINES AND TRENDS FOR ENVIRONMENTAL RECEPTORS, con't	Coastal 2000	Planned
	Test wildlife tissue for mercury concentration	Proposed, short term
	Monitor marine mammals, including beached whales, for mercury concentrations in tissue	Proposed, short term
	Participate in the development of a regional fish and wildlife database	Proposed, short term
	Research early biotic indicators	Proposed, short term
	Test sediment and core samples	Proposed, long term
EXPOSURE TO AND IMPACTS OF MERCURY	Research the extent and impact of subsistence fishing	Ongoing, expanded efforts would require additional support
	Research the extent and impact of the cultural use of mercury	Proposed, short term
4. FATE AND TRANSPORT OF MERCURY	Evaluate viable mercury dispersion models and their application to Massachusetts	Ongoing, expanded efforts would require additional support

CHAPTER 1: BACKGROUND

Mercury as an Environmental and Health Issue

Mercury is a metal that is commonly found in the environment in several forms, all of which are toxic. Depending on its exact chemical form and the dose received, people or wildlife exposed to mercury can suffer serious adverse health effects. Mercury in the environment is derived from both natural sources and human activities. Mercury is mobile and widely dispersed in the biosphere and persists once released. Methyl mercury is of particular concern, because it can become concentrated in living organisms, such as humans, fish, and other wildlife.

Mercury is an important environmental concern in Massachusetts and across the country. Extensive fish monitoring programs in Massachusetts and other states have led to some disturbing findings regarding mercury. The fish monitoring program in Massachusetts includes participation by the Department of Environmental Protection; the Department of Fish, Wildlife and Environmental Law Enforcement; and the Department of Public Health. For many water bodies in the Northeast, concentrations of methyl mercury in freshwater fish have been found to be above levels currently considered to be safe for regular consumption. These findings have led some states, including Massachusetts in 1994, to issue statewide health advisories warning pregnant women to avoid eating native freshwater fish. Pregnant women are of special concern because methyl mercury can cross the placenta and is particularly toxic to developing fetuses. Warnings that residents should refrain from eating fish from many specific water bodies have also been issued in 37 states; the Massachusetts Department of Public Health has issued such advisories for over 80 water bodies in Massachusetts.

Such advisories help to protect the public from potential adverse health effects of mercury but also indicate a need to further reduce sources of mercury. Ultimately, the only way to achieve this is to identify controllable sources of mercury and to then take steps to reduce them.

Sources of Mercury in Massachusetts

The unique properties of mercury have resulted in a long history of use by the enterprising human race. The mercury ore cinnabar has been found smeared on Neolithic skulls. In about 2000 BCE, mercury pigment was used on a tomb that was discovered on an island in the Mediterranean (Mitra, 1986). Today, its presence in button cell batteries, thermometers and other products establishes a place for mercury in every household.

Many thousands of tons of mercury have been mined during the past 50 years for use in electrical equipment, chemical processing plants, chlor-alkali plants, and pesticides. Mining essentially results in an accelerated

weathering process, by which much more mercury than normal is released from rocks. Much of the mercury used in manufacturing subsequently escapes into natural waters and the atmosphere.

Mercury is used in a number of consumer and commercial products. Some of these products are more commonly recognized as containing mercury than others. Mercury is found in varying amounts in batteries, fluorescent and high intensity light bulbs, thermometers, thermostats, and some switches. Mercury is also used to make chlorine and caustic soda and certain types of dental fillings. Some paints and pesticides made in the United States used to contain mercury as a preservative and fungicide but no longer do as a result of voluntary and required bans. Thus, citizens, hospitals, dental offices, farmers, builders, and certain types of manufacturing operations all use and eventually discard products containing mercury into the municipal solid waste stream or waste water. Mercury in solid waste may ultimately be released into a landfill or the atmosphere following combustion in waste incinerators. Mercury in waste water binds to residual sewage sludge or may be released into receiving waters with treated effluent. In Massachusetts, sewage sludge is burned in sewage sludge incinerators, reused as fertilizer, or landfilled; all of these routes provide opportunities for mercury release to the environment. In addition to mercury emissions associated with disposal and incineration of municipal wastes, mercury is also released into the atmosphere by the burning of fossil fuels such as coal and oil, medical wastes, and wood. Releases also occur:

1. when products containing mercury, such as fluorescent bulbs, are broken;
2. from volatilization during laboratory and industrial uses;
3. during cremation of human bodies, due to mercury use in amalgam fillings; and,
4. in the purification, or roasting, of ores.

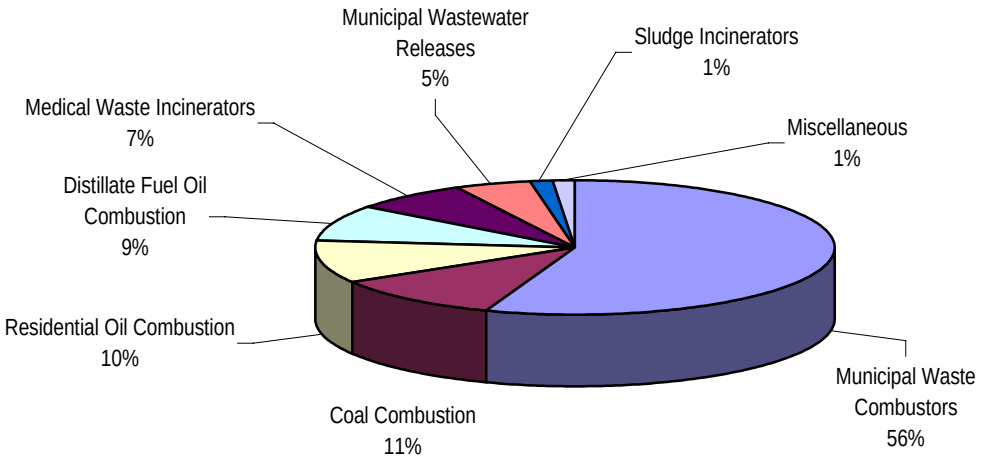
In addition to industrial activities, worldwide agriculture and mining have also contributed major amounts of mercury to soils, water and air.

While alternatives to mercury exist for nearly all practical applications, some uses are still considered beneficial or useful. For example, there is no known substitute for mercury in fluorescent and high intensity bulbs, which are more energy efficient than other types of lighting. Safe management of these products at the end of their useful life is essential to prevent the mercury they contain from being released. Ongoing research to reduce or eliminate the mercury in these products without sacrificing performance or affordability is also a high priority.

Figure 1 shows the estimated relative sources of mercury releases in Massachusetts, as calculated in DEP's 1996 "Mercury in Massachusetts" report (http://www.state.ma.us/dep/files/mercury/hgtoc.htm). In 1998, NESCAUM completed a "Mercury Study for the Northeast States and Eastern Canadian Provinces." The regional report reached conclusions consistent with those of DEP for relative sources of mercury releases.

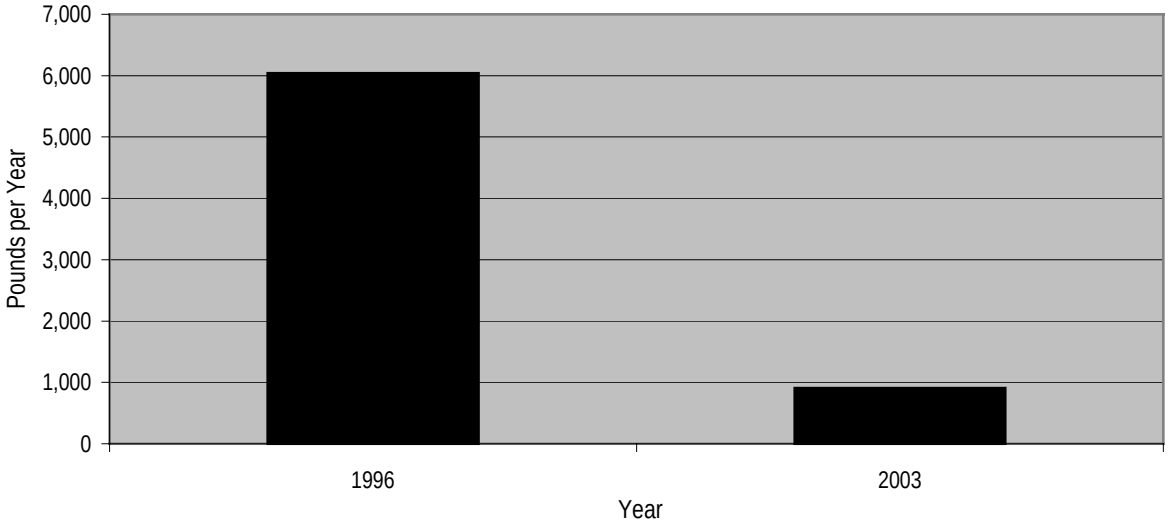
Figure 2 illustrates the estimated reduction in emissions by 2003 from municipal waste combustors as a result of the Municipal Waste Combustor Rule, promulgated by DEP in 1998. In 1996, municipal waste combustors were estimated to be by far the largest source of in-state mercury emissions. The Municipal Waste Combustor Rule requires facilities that incinerate 250 tons of more of solid waste daily to meet strict emission standards and to develop source separation programs for mercury bearing waste. Many other efforts

Figure 1
ESTIMATED SOURCES OF MERCURY RELEASES
IN MASSACHUSETTS, 1996



Based on data from "Mercury in Massachusetts," DEP, 1996.

Figure 2
ESTIMATED MERCURY RELEASES FROM MUNCIPAL WASTE COMBUSTORS,
REDUCTIONS AS A RESULT OF THE MUNICIPAL WASTE COMBUSTOR RULE



are underway to reduce mercury releases in Massachusetts. These are being developed by DEP, MWRA, and other state agencies.

As a result of both mandatory and voluntary measures, mercury in some products has been considerably reduced over the past ten years, particularly in batteries. These reductions will result in further decreases in the release of mercury from "end-of-pipe" sources, such as incinerators and waste water treatment plants.

Regional, National and International Context

Once released into the environment, mercury is carried long distances by air and water. About half of the mercury deposited in the Northeast is estimated to come from out-of-region sources. Massachusetts is similarly impacted by out-of-state sources. Much of the mercury released in Massachusetts will be deposited out-of-state. Given regional transport of mercury, it is essential that Massachusetts' efforts be viewed within the context of broader efforts, at the regional, national, and international levels.

THE CONFERENCE OF NEW ENGLAND GOVERNORS AND EASTERN CANADIAN PREMIERS REGIONAL MERCURY ACTION PLAN

In July 1998, Governor Paul Cellucci, along with the other New England Governors and the Eastern Canadian Premiers, adopted a Regional Mercury Action Plan. The Regional Mercury Action Plan forms the primary context for the development of the Zero Mercury Strategy. The Plan's goal is the virtual elimination of anthropogenic mercury releases, with an interim goal of a 50 percent reduction in mercury emissions by 2003.

The Regional Mercury Action Plan contains six action categories and over 40 specific action steps focusing on emission reduction, source reduction and waste management, outreach and education, and research and monitoring activities. A Regional Mercury Task Force has been established to prioritize and oversee the implementation of this plan.

Massachusetts executive agency staff played an active role in drafting the Regional Action Plan and play an active, ongoing role in its implementation. DEP co-chairs the Regional Task Force and its Pollution Prevention Subcommittee. The Regional Mercury Action Plan can be found at www.tiac.net/users/negc/1998mercuryplan.html.

OTHER NATIONAL AND INTERNATIONAL EFFORTS

The Great Lakes Binational Toxics Strategy, a Canada-US strategy for the virtual elimination of persistent toxic substances in the Great Lakes, has set the goal of a 50 percent reduction nationally in the deliberate use of mercury and a 50 percent reduction in the release of mercury from sources resulting from human activity

in the US by 2006. Canada has agreed to a 90 percent reduction in the release of mercury, or where warranted the use of mercury, from polluting sources resulting from human activity in the Great Lakes Basin by 2000. Through the Lake Superior Binational Program, Canada and the US, along with Ontario, Michigan, Minnesota and Wisconsin, have begun implementing a zero discharge demonstration project for mercury.

The EPA has established its own national EPA Action Plan for Mercury through its Persistent Bioaccummulative Toxics Initiative. EPA Region One has also incorporated a Mercury Challenge program into its Partners for Change initiative. To join the Partners for Change Mercury Challenge program, a facility must have a mercury inventory, a quantifiable mercury reduction goal, and an action plan; the facility must also report on the progress made toward achieving its goal.

Many other national and international efforts to address mercury pollution are underway. These include the Commission on Environmental Cooperation's Draft North American Regional Action Plan for mercury, the Draft EPA National Mercury Research Strategy, among others. Environment Canada is also aggressively addressing mercury under its Canada-wide standards process. The Regional Mercury Action Plan has been cited as a model program for action by several of these efforts.

In addition to these national and international initiatives, many other states have initiated programs to address mercury, including all of the New England states, Florida, Indiana, Kansas, New Jersey, New York, Michigan, Minnesota, and Wisconsin, among others. Details of all these efforts can be found on their respective webpages.

US EPA AND AMERICAN HOSPITAL ASSOCIATION MEMORANDUM OF UNDERSTANDING

A 1998 Memorandum of Understanding (MOU) between the American Hospital Association (AHA) and the United States Environmental Protection Agency has resulted in an ambitious project, now called Hospitals for a Healthy Environment (H2E), involving both signatories as well as many stakeholders. The main goals of the MOU are to virtually eliminate mercury from the health care waste stream by 2005 and to reduce the total waste volume by 33% in 2005 and 50% in 2010. Workgroups are now preparing model plans for mercury elimination, environmentally preferable purchasing, solid waste reduction, and best management practices. Both OTA and DEP are participating in these workgroups. AHA will be surveying its member hospitals in 2000 and regularly thereafter to monitor mercury and solid waste reduction as well as other environmental practices. Hospitals can participate in H2E by responding to the survey, signing a letter pledging to implement the MOU goals, and using the model plans and guidance documents to reduce mercury use, solid waste volume, and chemical waste, and to implement the other MOU goals.

NATIONAL POLLUTION PREVENTION ROUNDTABLE HEALTH CARE DISCUSSION GROUP

In November 1999, a discussion group was established to provide a forum to address steadily increasing concerns regarding the impact that health care has on the environment. The group facilitates the sharing of resources, expertise, and information between pollution prevention technical assistance providers and the

health care sector. In so doing, the group promotes the use of source reduction methodologies and sustainable practices as preferable approaches to dealing with issues and problems of concern. The group was founded and is chaired by a staff member from OTA.

Massachusetts Mercury Goal: Virtual elimination of anthropogenic mercury

Massachusetts' goal is the virtual elimination of the use and release of anthropogenic mercury. "Anthropogenic mercury" is mercury used for human purposes, such as mercury in thermometers, as opposed to mercury that is naturally released, such as that from the weathering of rocks. In support of this goal, the Zero Mercury Strategy seeks to promote approaches that a.) result in the permanent removal and long-term containment of mercury from the biosphere and b.) avoid simply transferring mercury pollution from one medium to another. Toward this end, the Strategy calls for reformulating or replacing products that contain mercury with safer substitutes to the maximum extent possible.

As a result of efforts already underway, Massachusetts expects to meet or surpass the regional goal of a 50 percent reduction in emissions by 2003. DEP estimates that emissions from municipal waste combustors will be reduced by about 85 percent as a result of improved emission control technology required by the Municipal Waste Combustor Rule. This is equivalent to a reduction of about 47 percent of total mercury emissions and discharges in Massachusetts. DEP estimates an additional 6 percent reduction in overall emissions and discharges by 2003 as a result of upcoming regulations on medical waste incinerators.

To further the effort toward virtual elimination, Massachusetts has set a second interim goal of a 75 percent reduction in mercury emissions by 2010. Like the goal of a 50 percent reduction by 2003, this goal will be measured from the 1996 baseline inventory of emission sources. DEP estimates that a 75 percent reduction in emissions and discharges can be achieved through a combination of upcoming regulations on coal-fired utilities, pollution prevention, more effective controls on waste water and sludge incinerators, and continued reductions at municipal waste combustors and medical waste incinerators.

As the largest end-of-pipe sources are more tightly controlled, the state is focusing significant efforts on pollution prevention, which will yield larger, long-term benefits for reaching virtual elimination. As new control technology becomes available, the state will also continue to address remaining end-of-pipe sources.

Task Force Process

Environmental Affairs Secretary Bob Durand formed the Massachusetts Mercury Task Force in September 1999. The Task Force is composed of staff from the Executive Office of Environmental Affairs (EOEA), as well as programs, offices and departments under the secretariat, including the Department of Environmental Protection (DEP), the Department of Fisheries, Wildlife and Environmental Law Enforcement (DFWELE), Coastal Zone Management (CZM), the Office of Technical Assistance (OTA), and the Strategic

Envirotechnology Partnership (STEP). The Task Force also includes members from the Massachusetts Water Resources Authority (MWRA), the University of Massachusetts Boston and, from the Executive Office of Health and Human Services, the Department of Public Health (DPH).

Following an initial meeting, Task Force members divided into seven sub-groups to collect information on current state efforts with regard to mercury reduction. The sub-groups were organized along topic areas in which work had been occurring: Household Hazardous Products, Medical and Dental Facilities, Waste Facilities, Utilities, Industry, Education and Outreach, and Research and Monitoring. The sub-groups developed reports that responded to ten basic questions regarding work underway, planned efforts, and perceived needs. Upon completion of the reports, the sub-groups as such were dissolved.

The full Task Force met a second time in December 1999, and decided that any comprehensive state strategy should involve stakeholder input. The Task Force resolved that a draft version of the Zero Mercury Strategy should be presented to a broad group of stakeholders in March for review and comment.

To draft a Zero Mercury Strategy, two committees were formed, the Gap Analysis and Research Committee and the Education and Outreach Committee. The Gap Analysis and Research Committee was assigned to identify "gaps" in Massachusetts' current efforts to reduce the use and release of mercury and to propose possible strategies to resolve these gaps. In conjunction with this, the Committee also proposed a draft research and monitoring agenda.

Because education and outreach was perceived to be such an important and under-developed element of Massachusetts' Zero Mercury Strategy, a separate committee met to develop this part of the plan. The Education and Outreach Committee identified populations for outreach, methods to reach each population, and elements of the educational message for each population.

The draft Strategy was presented for comment and review at a Stakeholder Forum at the end of March. The Forum was attended by 90 participants from private industry, non-profit groups, universities, and government organizations. A written comment period followed the Forum.

At the conclusion of the written comment period, the proceedings from the Forum were finalized and distributed along with the written comments to all Forum participants. Members of the Mercury Task Force met several times over two weeks to consider all comments received and incorporate them into the Strategy as appropriate. The comments are addressed in a separate document, "Zero Mercury Strategy: Response to Comments." The draft Strategy was further revised to reflect internal comments.

The final Strategy provides a framework for implementing a coordinated, multi-media, multi-agency approach to virtually eliminate the use and release of anthropogenic mercury in Massachusetts. The current status of mercury across sectors, ongoing efforts to reduce or eliminate the use and release of mercury, gaps in ongoing efforts, and Mercury Task Force recommendations are detailed in Chapter 2.

The Mercury Task Force will next develop a work plan for fiscal year 2001 and continue to meet on a periodic basis to coordinate implementation of the Strategy. An Advisory Committee will be created to provide stakeholders an ongoing mechanism to provide input on the Strategy's implementation.

CHAPTER 2:
ONGOING EFFORTS, GAPS, AND RECOMMENDED ACTION

The Mercury Task Force identified the current status of mercury sources across sectors, as well as ongoing efforts to reduce or eliminate the use and release of mercury. The Gap Analysis and Research Committee of the Task Force reviewed mercury reduction efforts to identify "gaps" in Massachusetts' efforts and to develop recommended courses of action. The Regional Mercury Action Plan provides the context for considering future steps.

2.1 SOURCES OF MERCURY

Sources of mercury, as considered by the Mercury Task Force, include both products that contain mercury and processes and facilities that release mercury to the environment. Releases may be direct, such as emissions from municipal waste combustors, or indirect, such as discharges containing mercury amalgam to the sewer system from dental offices that may ultimately reach the biosphere through waste water discharges, sludge incineration, or land application.

Both pollution prevention approaches, including product substitution, product reformulation, process change, and recycling, and methods to reduce end-of-pipe emissions and discharges were considered. A wide range of types of possible actions were discussed, including reviewing regulations, supporting legislation, providing technical assistance and equipment grants to the regulated community, and partnering with outside government agencies, industry and non-profit organizations on specific projects.

2.1.1 Products Containing Mercury

CURRENT STATUS

The disposal of products containing mercury, both as solid waste and in waste water, is an important source of mercury releases to the environment. Currently, the combined mercury emissions and discharges from waste facilities represent an estimated 69 percent of mercury releases in Massachusetts. To date, responsibility for preventing the release of mercury from waste products has been borne by the following:

- municipalities, which fund and operate hazardous household products (HHP) collection programs;
- the state, which provides funding and technical assistance to municipalities and regulated facilities through the Clean Environment Fund;

- some sewage treatment facilities, namely MWRA, which provides technical assistance to regulated facilities; and
- regulated facilities, primarily medical facilities in the MWRA service district.

The Municipal Waste Combustor (MWC) Rule, with a compliance date of December 2000 , establishes a emissions standard of 28 micrograms/dry standard cubic meter for facilities with a capacity of 250 tons/day or greater. The MWC Rule also requires regulated facilities to develop and implement materials separation plans or products containing mercury. As MWC's come into compliance with the MWC Rule, they will also share responsibility for removing mercury products from the wastestream and preventing the release of mercury to the environment.

Manufacturers of products containing mercury have taken limited steps so far toward ensuring that the mercury in their products is not released into the environment at the end of life. Limited voluntary efforts, namely the Thermostat Recycling Corporation that provides free recycling of used mercury thermostats, have recently begun operation in Massachusetts. The Mercury Task Force seeks an increased commitment to product stewardship from manufacturers through the passage of a comprehensive Mercury Products Bill, including the reduction in use of mercury, the labeling of mercury bearing products and the establishment of recycling programs.

Currently, recycling opportunities for products containing mercury are limited. Less than 10 percent of Massachusetts' population has access to convenient, comprehensive household hazardous products (HHP) collection programs, defined by DEP as a center or permanent program that provides for collection of all hazardous products at least three times per year and whose participants have no more than a 30 minute drive to reach it. In 1999, 248 of Massachusetts' 351 municipalities offered some type of household hazardous waste collection. However, very few offered convenient access to permanent programs, and some have never held an HHP collection for their residents. The number of HHP collections varies each year, as municipalities fund and determine the nature and frequency of collections.

Environmentally preferable products are currently available for some, but not all products containing mercury. The need exists for more alternatives and better information on these alternatives for consumers, institutions and businesses.

ONGOING EFFORTS

- Mercury Products Legislation

  Legislation addressing products containing mercury has been sponsored by Rep. Douglas Petersen, House Chairperson of the Joint Committee on Natural Resources and Agriculture, and strongly supported by the Cellucci administration. Among other provisions, the legislation would require the labeling of all mercury-added products. Manufacturers would also be required to identify or develop a take back program for mercury-added products.

In addition, the Northeast Waste Management Officials Association (NEWMOA) and the Regional Mercury Task Force (RMTF) have developed draft model mercury legislation. This draft has been subject to public review and input via two regional stakeholder meetings with an extended written comment period. The draft is currently being revised in response to public comment. The NEWMOA-RMTF draft model legislation is discussed in more detail below. The RMTF will develop a coordinated strategy for introducing elements of the model legislation in state legislatures in the region.

House Bill 4803, An Act Regulating Products Containing Mercury

A mercury products bill, House Bill 4803, has been filed in the state legislature by Rep. Douglas Petersen, House Chairperson of the Joint Committee on Natural Resources and Agriculture. EOEA and DEP have testified strongly in favor of this bill.

H.B. 4803 distinguishes between "mercury-added products" as those to which a manufacturer intentionally introduces mercury and "mercury-containing products" as those where mercury is an unintended ingredient. The bill requires that all mercury-added products be labeled and requires that manufacturers provide or identify collection and recycling systems for these products. The bill bans the disposal of mercury-added products. Manufacturers of mercury-containing products used in health care facilities are required to disclose the mercury content of their products to health care facilities.

The most recent version of the bill has been amended to eliminate the requirement established under the Municipal Waste Combustor Rule that municipal waste combustors develop, implement and fund mercury source separation plans for products containing mercury.

The full text of H.B. 4803 is contained in Appendix B.

Regional Model Mercury Legislation

As specified in the Regional Mercury Action Plan, the Regional Mercury Task Force is in the process of developing a model mercury products bill. The draft model legislation is more comprehensive in scope than the Petersen bill and includes provisions for:

- requirements that manufacturers notify states and provide information on the mercury content of their products;
- bans on the frivolous use of mercury in products;
- restrictions on the sale of mercury fever thermometers, dairy manometers, and elemental mercury; and
- a phase-out process with exemptions for mercury-added products which contain between 10 mg and over a gram of mercury.

The draft regional model legislation can be found at www.newmoa.org/Newmoa/htdocs/prevention/mercury. Each of the New England states, except Rhode Island, is currently in the process of considering some form of mercury products legislation.

- Hazardous Household Products Collection Programs

In the last two years, DEP has provided a total of $119,000 to municipalities for mercury materials collection programs. The funds have been used for 32 storage sheds for collected material, spill kits, training, and market service grants. The funds were provided from the Clean Environment Fund (CEF) through EOEA.

EOEA and DEP have funded and are extending a universal waste project through the University of Massachusetts Amherst, which has established mercury product recycling programs and distributed mercury safety kits and information on alternative products to 21 Western Massachusetts municipalities.

The Lexington Minuteman Household Hazardous Products Facility is a permanent collection site for mercury-added products and other hazardous household products. The Facility serves 12 surrounding towns and small businesses; its construction was financed by EOEA and DEP. This year, DEP is expanding its municipal grant program to encourage the establishment of more such facilities across the state. DEP is also funding a project by the town of Burlington to conduct thermometer collection and replacement in conjunction with local pharmacies.

DEP has developed a "Proposed Action Plan for Managing Hazardous Materials from Massachusetts' Households and Eligible Small Businesses." The Plan includes the following objectives:

1. Expand access to all of Massachusetts residents and very small quantity generators to convenient, comprehensive, cost-effective hazardous products programs by 2010, with four permanent programs in each of the four DEP regions by the year 2005 (16 total within the state).
2. Reduce mercury received at combustion facilities by 50% over baseline inlet tests conducted in 1999 by the end of 2003. The "inlet tests" refer to tests of emission gases at municipal waste combustors before cleaning by pollution control equipment.
3. Increase participation in mercury waste collection programs to 50% of all municipalities by the end of 2003.

- State Purchasing Initiatives

The Operational Services Division (OSD) of the Executive office of Administration and Finance administers the state's procurement process. The Environmentally Preferable Purchasing Program at the OSD is committed to reducing procurement of mercury-containing items through its contracts. Fluorescent bulb recycling services are available through a state contract for all state agencies and municipal governments, including government schools and hospitals. OSD also includes water treatment

chemicals free of trace mercury in its water treatment chemical contract. The Medical Procurement Management Team at the Operational Services Division is awarding points in bids for dental suppliers who supply mercury-free amalgam substitutes and will be investigating other ways to implement mercury reduction in its contracts. Mercury-free thermometers and blood pressure equipment are already available on state contract.

As state purchasing contracts come up for renewal or rebidding, OSD will review them to determine if mercury products are currently available on this contract and whether mercury-free substitutes can be incorporated. New products that can substitute for products containing mercury will be reviewed for addition to current contracts on an ongoing basis.

- Product Stewardship Programs

"Product stewardship" is a principle whereby manufacturers assume responsibility for the full lifecycle costs of their products. Voluntary takebacks are one example of product stewardship; they are organized and operated by manufacturers of products containing mercury, providing recycling of mercury contained in these products.

Thermostat Recycling Corporation

The Thermostat Recycling Corporation (TRC), a project of Honeywell and other thermostat manufacturers, has recently begun operation in Massachusetts. TRC provides free recycling of mercury-containing thermostats. Heating, ventilation, air conditioning and refrigeration wholesalers and suppliers will pay a one-time deposit fee (estimated at $15-$20) and receive the thermostat collection bin and directions for pick-up of a full bin. TRC will handle the fees for shipping, handling, and recycling of the mercury-containing thermostats. Twenty-nine wholesalers and suppliers are currently participating as collection sites.

GAP ANALYSIS

The lack of labeling and recycling opportunities present a considerable barrier to reducing the use and release of mercury.

Expanding collection of household hazardous products is a second approach that will be explored. This would likely require increased funding from DEP to help municipalities establish HHP collection sites and events. Increasing assistance to municipalities would require increased appropriations to the recycling budget from the CEF. The CEF was created as a dedicated fund for recycling, which includes HHP collection. In FY 2000, only $9.5 million of over $25 million in the CEF was allocated for recycling by the Legislature. The balance of the CEF was allocated for other programs, leaving a surplus of $11 million.

FY 2001 PLANNED NEW ACTIVITIES

- Expand Efforts toward the Passage of Mercury Products Legislation

  The Gap Analysis and Research Committee felt that the passage of a bill addressing labeling and product stewardship for products containing mercury would be one of the most important steps Massachusetts could take to reduce the use and release of mercury.

  The Massachusetts Mercury Task Force will continue and expand its work with a broad range of government, private and non-profit organizations to provide outreach and education on the elements of mercury reduction legislation and to build strong support for adoption of comprehensive product stewardship requirements.

- Expanded Product Stewardship Programs

  DEP will work with municipal waste combustors through the Materials Separation Plans and Supplemental Environmental Projects to expand participation in the Thermostat Recycling Corporation thermostat take back program.

  The establishment of other voluntary take back programs will be pursued. Efforts will be made to evaluate such programs and ensure their effectiveness.

ADDITIONAL RECOMMENDED ACTION

- Hazardous Household Products Collection Programs

  The Mercury Task Force recommends that the state legislature increase its appropriation from the CEF to the state's recycling budget to $10.2 million for FY 2001, providing additional support for the development of HHP collection programs.

- Promotion of Environmentally Preferable Products

  Increase the availability of information on non-mercury products.

  Support the development of non-mercury and reduced-mercury products. (See Research and Monitoring Strategy)

- Clean Sweeps

Clean sweeps are discrete events, developed for a clearly defined population. The population, for example, a school or employees of a certain company, will be given the opportunity to dispose of any mercury-bearing products or waste they own at a convenient, specified location and time.

In particular, the Mercury Task Force will investigate the feasibility of surveying water suppliers for mercury flow meters, followed by a clean sweep of obsolete items.

ACTION REQUIRING ADDITIONAL EVALUATION

- Review of State Regulations

Opportunities may exist to reduce the use of products containing mercury and to increase the recycling and proper management of products containing mercury by amending specific state regulations.

Massachusetts Sanitary Code, Chapter 10

The Mercury Task Force will investigate the feasibility of modifying the Massachusetts Sanitary Code Chapter 10 to include a prohibition on the use of mercury bearing oven and candy thermometers in commercial and institutional kitchens.

Massachusetts Building Code

The Mercury Task Force will investigate the feasibility of modifying the Massachusetts Building Code to require that mercury bearing devices be removed from a structure and recycled or disposed before a demolition permit may be issued.

- Develop incentives to make non-mercury products economically attractive.

The cost of non-mercury alternatives varies considerably. Often, alternatives cost the same as products containing mercury, although sometimes their costs are much higher. The price of newer products tends to fall as their market share increases, so incentives that encourage expanded use are important. Moreover, when facilities try to systematically replace their mercury products, they can incur significant short-term expenses. The Mercury Task Force will investigate options for reducing cost differentials, and may evaluate tax credits and other mechanisms for offsetting short-term costs.

2.1.2 Medical and Dental Facilities

CURRENT STATUS

Medical and dental facilities use products that contain significant amounts of mercury. Currently, incentives to replace or reduce products containing mercury are limited, except for hospitals located in the MWRA service district. This situation is expected to change when DEP promulgates new medical waste incinerator regulations, which will include mercury source reduction/segregation requirements. Moreover, as MWC's develop mercury source separation plans in their service areas, health care facilities may be targeted for the development of mercury reduction programs.

Mercury is prohibited in industrial discharges to the MWRA system; hospitals are considered industrial dischargers. MWRA's enforcement action level is 1 ppb. This provides incentive to switch to non-mercury alternatives for products that would normally be poured down the drain after use. While hospitals do incur costs when mercury-added equipment breaks, they do not normally take this cost into account when buying new equipment.

ONGOING EFFORTS

- Medical Facilities

  MWRA has completed a very successful five year cooperative project with medical facilities in the Boston area to reduce mercury in their waste water discharges. This effort is described in greater detail in Appendix A.

  In addition to conducting substantial outreach to hospitals at conferences and workshops across the state, DEP has received a grant from EPA to train its staff to conduct audits of hospitals, focusing on source and volume reductions for mercury, hazardous, and medical wastes. DEP's partners for this project include the Mass. Hospital Association, OTA, Health Care Without Harm (HCWH), MWRA, and DPH. DEP has also partnered with Beth Israel Deaconess (BID), EPA, and HCWH to institute battery and thermometer collection/replacement events for facility employees. These events resulted in the collection and replacement of over a thousand thermometers and also provided employees with education on common consumer and hospital mercury-containing products and non-mercury alternatives. In addition, DEP has provided funds to UMass Lowell's Sustainable Hospital Project for their web site and for research of non-mercury medical products. Finally, DEP has developed two Supplemental Environmental Projects as parts of enforcement cases involving health care facilities that require hospitals to reduce their use of mercury products.

  OTA assists hospitals with mercury reduction upon request as part of its regular assistance program. OTA also facilitates a Health Care Environmentally Preferable Purchasing Roundtable, a forum to facilitate communication between hospitals and state assistance agencies regarding, among other things,

reduction of mercury use in health care. OTA publishes the Health Care Environmentally Preferable Information Exchange newsletter, which is issued every other month.

The Cellucci Administration is considering legislation to amend the Toxics Use Reduction Act. One of the provisions of this legislation would be to include hospitals in the universe of entities that are required to implement the reporting and planning aspects of TURA. Under the new program, hospitals would be required to report on their use of mercury at a level of 10 pounds per year or more. In addition, hospitals would be required to plan to reduce their use of mercury.

- Dental Offices

MWRA is continuing work with the Massachusetts Dental Society, Tufts Dental School, and local dentists to increase awareness of the environmental impacts of dental amalgam discharge (a typical amalgam can contain up to 50 percent of mercury); promote appropriate dental "housekeeping" practices; and pilot test amalgam separators to minimize mercury releases.

Sampling of Boston area dental facilities indicates that dental waste waters contain high loads of mercury and other metals that result from the installation and removal of dental amalgam. This is consistent with studies done at several other POTW's nationally. The amount of mercury in MWRA dental office waste water samples is roughly equivalent to the amount contributed by all other facilities sampled by MWRA. The executive summary of MWRA's study, "Mercury in Dental Facilities," is available at www.mwra.state.ma.us under the Toxic Reduction and Control section on publications (go to: "Doing Business with MWRA"). MWRA is closely monitoring the outcome of several other dental facilities studies from other POTWs, primarily in the Great Lakes states, to determine what removal and reduction techniques are most successful.

Education and outreach is a key element to MWRA's dental amalgam control program. MWRA staff, at times accompanied by DEP staff, made nine appearances at Massachusetts Dental Society sponsored events, including the 1999 Yankee Dental Congress. MWRA staff distribute a guidance document, "Dentistry and the Environment," which details ways dentists can reduce their discharge of mercury and other metals of concern. This brochure is being distributed to dental facilities and other interested parties in the MWRA service area. In addition, MWRA's Toxic Reduction and Control Department (TRAC) presented dental study findings at health care conferences in Massachusetts and Minnesota to promote new approaches to dental practices that reduce discharges of toxic metals to the sewer system.

DEP has provided information to area dentists about the environmental and health impacts of mercury, opportunities to segregate mercury for recycling, and DEP's policies and regulations. DEP's Universal Waste Rule has reduced many regulatory barriers to encourage recycling of mercury-containing products. Also, DEP is working with the STEP program to encourage the development of innovative treatment technologies for mercury amalgam.

GAP ANALYSIS

Many medical facilities lack information and financial incentives to switch to non-mercury alternative products. Many dentists lack incentives and information regarding new amalgam separation technologies to remove mercury from their waste water.

FY 2001 PLANNED ACTIVITIES

- Expand Efforts toward Passage of Mercury Products Legislation

  Currently, hospitals that wish to reduce their use of mercury cannot obtain information about the mercury content of many of the products they purchase. Hospitals often use large volumes of products with small concentrations of mercury, below the reporting threshold for Materials Safety Data Sheets. For hospitals within the MWRA district, discharge of these products can violate MWRA's 1 ppb enforcement action level. To avoid violations, hospitals have had products tested themselves, often repeating tests for different batches of a product.

  Both H.B. 4803 and the regional model mercury products bill require manufacturers to test and disclose the mercury content of products to medical customers. The phase out and ban provisions of the regional model legislation will encourage the development of non-mercury alternatives. The take back requirements will reduce the cost of responsible waste management.

- Development of a searchable web-based database of trace mercury test results for chemicals used in medical facilities.

  OTA is in the process of developing such a database.

- Collection of bulk elemental mercury from dental offices

  DEP is working with Stericycle and the Mass. Dental Society to implement statewide collection and recycling of elemental mercury stocks and to raise the environmental awareness among dentists about safe handling of mercury, and recycling/substitution opportunities which are currently available. It is estimated that more than 500 pounds of mercury may be collected through this program.

- Encourage the adoption of amalgam separation technology in the MWRA service district

  MWRA will be working with the MDS to develop a program for dental facilities. In December, 1999, the International Standard Organization (ISO) issued a standard test method for certifying amalgam separation technology. In order to meet the ISO standard, separators would have to be able to remove

95 percent or more of the amalgam particles in a uniform sample. The ability to implement the ISO test would give the state the ability to identify technology suitable to satisfy technology-based management requirements for dental facilities. MWRA will be working with MDS to evaluate this test for use in Massachusetts. DEP, through its innovative technology program, is also working to evaluate separation technologies and to encourage their use.

ADDITIONAL RECOMMENDED ACTION

- Establish and/or promote a reward program for medical facilities.

  The Mercury Task Force recommends that the state promote the EPA New England Partners for Change: Mercury Challenge program for medical facilities and that the state investigate the feasibility of establishing its own award program for medical facilities.

- Further Recommendations

  - ♦ Work with insurance companies to fully cover non-mercury fillings.
  - ♦ Work with the Massachusetts Dental Society to provide education to practicing dentists and dental schools on the performance and costs of alternatives to mercury amalgam.
  - ♦ Work with the Massachusetts Dental Society to encourage all dentists in the state to install amalgam separation technology and ensure the proper disposal/recycling of collected mercury-bearing wastes.

ACTION REQUIRING ADDITIONAL EVALUATION

- Explore opportunities to financial incentives to hospitals to purchase mercury-free equipment through tax credits or other mechanisms.
- Require hospitals to have mercury reduction plan in place to be licensed by DPH.
- Establish voluntary takebacks with credit for mercury-free replacement for mercury-added medical equipment.
- Expand spill response education and enforcement.

2.1.3 Waste Facilities

Waste combustion facilities, including municipal waste combustors, medical waste incinerators, and sludge incinerators, are responsible for the majority of current mercury emissions in Massachusetts. Other waste management facilities such as landfills and sewage treatment facilities, known as publicly-owned treatment works (POTW's), also release mercury to the environment.

Aggressive mercury control limits on many sources have been proposed as part of the Regional Mercury Action Plan. Thus far, regulations have been adopted by DEP for municipal waste combustors with a capacity of over 250 tons per day. MWRA, the state's largest POTW, has also imposed strict mercury limits. Medical waste incinerator regulations with strict new mercury limits are being developed by DEP. Other sources remain to be addressed, in part due to information gaps on emission levels, control technologies and pollution prevention technologies.

MUNICIPAL WASTE COMBUSTORS

- Current Status and Ongoing Activities

  Municipal waste combustors (MWC's) are estimated to be, by far, the largest current source of mercury emissions in Massachusetts. The MWC Rule, promulgated by DEP in 1998, requires facilities with a capacity of 250 tons per day or greater meet an emission standard of 28 micrograms/dry standard cubic meter (ug/dscm). The compliance deadline for the emission standard is December, 2000.

  The regulations require facilities to submit four quarters of data from inlet testing. The data will allow DEP to establish a baseline to evaluate the effectiveness of future reduction efforts. It is estimated that the MWC Rule will result in the removal of between 75 and 90 percent of the mercury in the emission gases of these facilities. Compared to 1995 levels, this will reduce the total emissions from this source category by a very substantial margin. For a graphic representation of the estimated reduction, see Figure 2 on page 7.

  The MWC Rule also includes a provision requiring facilities to develop, fund and implement material separation plans for mercury-bearing wastes. DEP published guidance for facilities to use in developing the required material separation plans in January 2000. The linkage of source reduction and source separation within the regulations is a model DEP expects to employ in other emission control regulations.

  Massachusetts has two municipal waste combustors with capacities of less than 250 tons per day, in Springfield and in Pittsfield. As part of an administrative consent order, DEP has required the Pittsfield facility to comply with the 28 ug/dscm mercury limit by December 2000, and to develop a materials separation plan. DEP plans to modify the MWC Rule to include small facilities once EPA has completed its regulations for small MWC's.

- Gap Analysis

  Without labeling of mercury-containing products, the materials separation plans will be more difficult to implement and less effective at preventing the incineration of mercury in solid waste.

- FY 2001 Planned Activities

  DEP will review and approve material separation plans in implementing the MWC Rule. Plans will be submitted to DEP by July 2000. Implementation of these plans will help facilities enhance mercury reductions and reduce costs associated with the ongoing operation of the pollution control equipment at these facilities. These pollution prevention requirements will also move these facilities closer to the goal of virtual elimination.

- Additional Recommended Action: Passage of Mercury Products Legislation

  Requiring labeling of mercury-bearing products will help consumers and waste handlers identify these products. This is an essential piece of public education required to make the materials separation plans as effective as possible, preventing the incineration of mercury mixed with solid waste.

MEDICAL WASTE INCINERATORS

- Current Status

  Medical waste continues to contain considerable amounts of mercury, which can be released when the waste is incinerated.

- Ongoing Activities

  DEP is in the process of developing a Medical Waste Incinerator (MWI) Rule. Similar to the MWC Rule, it is anticipated that this rule will link strict mercury emission controls and mercury source separation/reduction requirements. DEP is considering an emission limit of 55 ug/dscm for this source category. This limit is consistent with the Regional Mercury Action Plan and is ten times lower than that proposed by EPA. Based on available stack test data and opportunities for reducing the use and disposal of mercury containing products in the health care industry, the Regional Mercury Task Force determined that medical waste incinerators could meet emission limits of at least 55 ug/dscm and possibly lower.

  Requirements for source reduction and source segregation of products containing mercury are also being considered.

- Gap Analysis

  Many opportunities exist to reduce the use of products containing mercury. Strict emission limits on mercury from medical waste incinerators are not currently in place, but are now being developed by DEP.

- FY 2001 Planned Activities

  DEP plans to complete the Medical Waste Incinerator Rule in FY 2001.

- Action Requiring further Evaluation

  To further maximize source reduction efforts at hospitals, the potential of DPH to require hospitals to develop and implement mercury source separation/reduction plans as a component of their permitting process will be explored.

PUBLICLY-OWNED TREATMENT WORKS AND SEWAGE SLUDGE COMBUSTION FACILITIES

- Current Status and Ongoing Activities

  Mercury may be discharged into sewage treatment systems, also known as "publicly-owned treatment works" (POTW's), by medical facilities, dental offices, households, industry and other system users. Mercury tends to adhere to sewage sludge, but can also be discharged with treated water. In Massachusetts, sewage sludge is reused as fertilizer, burned in sludge incinerators, or landfilled. Through any of these means, mercury can be released into the environment.

  POTW's can only directly control some of the sources of mercury entering their system; mercury also enters from atmospheric deposition and groundwater. The Massachusetts Water Resources Authority (MWRA) is the largest POTW in the state and has monitored mercury closely in its effluent, sludge and treated water since the early 1990's. Based on estimates developed from MWRA data, POTW's are a considerable source of mercury released to the environment.

  EPA's National Pretreatment Program requires POTW's to control and monitor pollutants, including mercury, from industrial sources through "local limits." Local limits regulate contaminants in the discharge from industrial users, including medical facilities, to the sewer system. The EPA model to determine local limits examines the likelihood of a contaminant reaching elevated levels in the environment, based on the characteristics of receiving waters and the fate of sewage sludge. The model does not take into account the regional goal of virtual elimination of mercury releases. As a result, a wide range of local limits for mercury exists in Massachusetts; requirements are not universal or uniform.

MWRA prohibits mercury discharges from industrial sources, including hospitals, and has developed pre-treatment and source reduction programs that have substantially reduced mercury inputs from controllable sources. POTW's can also play a role in public education of citizens to reduce unregulated disposal of mercury into the sewer system by residential customers.

- Gap Analysis

Currently, no programs or regulations exist at the state or federal levels to consistently require or provide incentives to virtually eliminate the release of mercury from POTW's.

- Recommended Action

Identify and implement strategies to reduce mercury in POTW effluent and residuals.

These efforts may include some combination of the following, all of which require further evaluation:

- revisions to local limits for mercury discharges;
- revisions to current limits on mercury levels in land applied sludge;
- the establishment of emission limits for mercury from sewage sludge incinerators;
- incorporation of mercury reduction in DEP's revised sewer connection program using the Environmental Results Program as a model; and
- establish sediment criteria for mercury.

Increase capacity building efforts to assist municipalities in reducing mercury levels at POTW's

This effort would involve capacity building programs and information sharing efforts to provide information to POTW's across the state. It would be based on the successful mercury reduction programs underway at MWRA and DEP.

Additional Recommendations:

- Promote cooperative partnerships with POTW's and the Massachusetts Dental Society.
- Work with local Boards of Health, which implement provisions of Title V of the Massachusetts Sanitary Code, to reduce discharges into septic systems. This effort may focus on outreach to dentists in areas without sewers about reducing their mercury use and discharges.

2.1.4 Utilities

CURRENT STATUS

Coal burning power plants are one of the largest sources of mercury releases in Massachusetts; nationally, they are the largest source of mercury emissions. At present, their release of mercury is unregulated. The amount of mercury released varies among plants, depending on the type of coal used, whether it has been pretreated for sulfur, and the existing pollution control equipment. The burning of coal containing small quantities that, over a long period of time, cumulatively result in a significant release of mercury to the environment. Power plant boilers are one of EOEA's top priorities for emission reductions.

ONGOING EFFORTS

In October 1998, the Clean Air Now Coalition (the Coalition), made up of over 200 community and environmental groups, challenged Governor Cellucci to require older power plants to meet new plant standards. Governor Cellucci committed to a power plant clean up and directed the DEP to work with the Coalition and the plant owners to reach this goal. DEP held a series of meetings to clarify and quantify the Coalition's goals and to explore methods of making reductions to reach their targets. In February of 2000, Governor Cellucci directed Secretary Durand and Commissioner Liss to bring the owners of the dirty coal and oil burning units together to seek voluntary reductions in a comprehensive suite of pollutants including mercury (as well as SOx, NOx, particulates, CO2). The goals included significant reductions at each plant beginning in the year 2003. The five companies have responded with voluntary plans of varying levels of clarity and specificity.

On May 9, 2000, Governor Cellucci released summaries of these plants and announced that he is directing DEP to release regulations by the end of May to clean up plants significantly. Several companies are switching to CNG which is virtually mercury free. Other companies have affirmed their commitment to mercury reductions, in part to be achieved using state of the art control equipment to reduce SOx and particulates. Clearly a multi-pollutant strategy will be the most cost-effective mechanism for making significant cuts in mercury emissions from the power sector.

This will set a process in motion for adoption of regulations requiring significant mercury reductions consistent with our goal of eventual elimination of anthropogenic emissions. In aggregate, the companies will be required to reduce SOx by 50% beyond Phase 2 Federal requirements. Dedicated equipment for mercury control will be demonstrated at a minimum of one major facility. The timeframes for utility controls will be one subject of the DEP public hearings.

2.1.5 Industry

CURRENT STATUS

Very little is known about the use of mercury in industrial processes in Massachusetts. The Massachusetts Toxics Use Reduction Act (TURA) requires Massachusetts manufacturers to report the amount of certain chemicals, including mercury, used in the manufacturing process and released as waste. TURA is more stringent than the federal Toxics Release Inventory (TRI), which requires manufacturers to report only pounds of chemicals released as waste. Until January 2000, the reporting threshold for mercury was 10,000 pounds per year. No industry in Massachusetts has reported using mercury in this volume.

As a result of action by the administrator of the EPA the reporting threshold for mercury under TRI and TURA has dropped to 10 pounds per year. Due to this change, the state will to receive information from manufacturers on their use and emissions of mercury.

ONGOING EFFORTS

The Cellucci administration is considering changes to TURA that would require a greater emphasis on PBT's, including mercury.

GAP ANALYSIS

The increased focus on mercury under TRI and TURA will allow the state to gain a better understanding of how it is currently being used by Massachusetts manufacturers and how to best target the technical assistance resources of the TUR/Environmental Stewardship program towards mercury elimination.

RECOMMENDED ACTION

- Provide technical assistance and education to companies that use mercury in the manufacturing process.

  The increased attention on the manufacturing use of mercury will require the TURA program to focus more resources on mercury through its technical assistance and education efforts. This assistance could include process changes to eliminate the need for mercury, research of product alternatives and new manufacturing technologies to limit the use of mercury.

- Provide technical assistance and education to companies that manufacture products containing trace levels of mercury.

  The Office of Technical Assistance will begin meeting with companies to educate them on ways that they can eliminate any unintended or trace mercury that appears in their products. This trace level may or may not meet a reporting threshold under the Toxics Use Reduction Act. In many cases, eliminating it may be a simple matter of switching feedstock.

2.1.6 Recommendations to the Legislature

PASS A COMPREHENSIVE MERCURY PRODUCTS BILL

The passage of a comprehensive mercury products bill (further described in section 2.1.1) is one of the most important steps Massachusetts can take to reduce the release of mercury to our environment. The release of mercury from products through waste facilities accounts for approximately 69 percent of the releases in Massachusetts. Increased manufacturer responsibility for the prevention of these releases through changes in the manufacturing process, reformulation of products, labeling and recycling programs is essential for Massachusetts to reach its goal of virtual elimination.

INCREASE FUNDING TO THE CLEAN ENVIRONMENT FUND TO $10.2 MILLION FOR FY 2001

Municipalities receive grants to assist in the establishment of hazardous household collection programs from EOEA and DEP through the Clean Environment Fund (CEF). The CEF was established as a designated fund for recycling and hazardous household waste programs; in FY 2000, the Legislature appropriated only $9.5 million of over $25 million in the CEF for this purpose. The balance of the CEF was allocated for other programs, leaving a surplus of $11 million. The Mercury Task Force recommends that the Legislature increase funding for recycling and hazardous household waste programs to $10.2 million for FY 2001.

2.2 OUTREACH AND EDUCATION STRATEGY

CURRENT STATUS

Outreach and education on various aspects of mercury, primarily fish consumption advisories and the proper management of mercury bearing waste, is conducted by individual state agencies.

ONGOING EFFORTS

Education on mercury is conducted by the Department of Public Health (DPH) regarding freshwater fish advisories. Fish advisories are mailed to all Boards of Health with the suggestion that the advisory be posted in the local newspaper. DPH provides posters explaining fish advisories to towns and suggests that they be posted at town hall and at the water body with the advisory. Posters have been translated by DPH into six languages, tailored to the needs of specific communities. DPH also conducts special educational sessions with Boards of Health, in which fish advisories may be a topic covered.

In conjunction with the Department of Fish and Wildlife, DPH posts posters on the fish advisories at every location that issues fishing licenses. A telephone number to call for more information on fish advisories is included with every fishing license. DPH receives many calls through this number.

DPH conducts "Grand Rounds" at hospitals throughout the state, providing seminars for physicians. Mercury contamination in fish is sometimes an explicit topic covered; materials covering the fish advisories are always distributed.

DEP has an "Answers" booklet addressing consumers most commonly asked questions about hazardous household products. The booklet includes information on mercury-added products like fluorescent lamps and batteries. This year DEP is offering a variety training programs for communities addressing the following topics: Universal Waste Collection Program Training, Safe Management of HHP, Hazardous Waste Basic Training, and a Higher Education Educational Roundtable. EOEA and DEP hold an annual HHP Forum, which includes presentations on the management of products containing mercury and the availability of mercury-related state grants and contracts. DEP has conducted outreach on mercury issues at local, regional, and national conferences, workshops, and forums. Through its own efforts and through grants to UMass and communities, educational materials have been developed to inform citizens about environmental and health impacts of mercury, available recycling options, safe cleanup procedures, and information on products which contain mercury as well as non-mercury alternatives

GAP ANALYSIS

The Mercury Task Force identified outreach and education as a key area in need of additional efforts. Currently there is no coordinated, comprehensive strategy in place to guide multi-agency outreach and education on mercury. This may result in missed opportunities and duplication of efforts.

RECOMMENDED ACTION

The following outreach and education strategy was developed to begin to address this gap. It lays out a comprehensive strategy to address the informational needs of key target audiences. Specific priorities for implementing this plan will be established by the Task Force, with further input from stakeholders. The goals of the education and outreach strategy are:

1. Protect public health through reduced human exposure to mercury,
2. Reduced use of mercury,
3. Proper management of mercury-bearing waste, and
4. Increased public awareness of the nature and impacts of mercury.

The Outreach and Education Committee identified populations or target audiences for education and outreach, including, broadly, populations at risk and populations that may release mercury into the environment through improper disposal. Most populations identified actually fell into both categories. Those perceived to be at greatest risk from mercury exposures were classified as "populations of particular concern." For each target audience, three components of an education and outreach strategy were identified: 1.) information to be communicated, 2.) communication channels and mechanisms, and 3.) examples of existing material, whether developed in Massachusetts or elsewhere.

Basic education message

All education and outreach will contain basic information on mercury and its health and environmental impacts.

- Health impacts of mercury, including direct contact and consumption of contaminated fish, can be serious.
- Massachusetts fish consumption advisories have been issued across the state.
- Mercury is contained in common household products, such as button cell batteries, fever thermometers, fluorescent bulbs, thermostats, and blood pressure cuffs. Mercury-free alternatives to these products should be purchased when possible (except for fluorescent bulbs), and products that contain mercury should always be recycled as hazardous material.
- Spill and breakage cleanup procedures should be learned and used.
- Children and adults should not play with mercury.

In developing materials, sensitivity to cultural implications of graphics, including numbers, colors, etc., that may be offensive or ineffective for certain audiences will be considered.

Fish consumption advisories

Perhaps the most important component of the education and outreach strategy are the fish consumption advisories issued by DPH. In 1994, DPH advised that pregnant women not consume native freshwater fish caught in Massachusetts; advisories for the general public have been issued for over 80 water bodies as testing is completed. DPH plans to reissue an updated fish consumption advisory this year.

The internet as an education and outreach tool

As part of its revised website, EOEA will post a mercury website with links to information on all efforts toward mercury elimination and reduction in state executive agencies, as well as information on fish consumption advisories and the health effects of mercury. It is expected that this resource will expand as new efforts are initiated.

The website will serve to supplement other education and outreach activities, which, due to their nature, may include abbreviated, "soundbite" messages. DPH has posted the freshwater fish consumption advisories on its website (www.magnet.state.ma.us/dph/beha/fishlist.htm); the page gets about 1,000 hits a month. By including the website address of the EOEA mercury website in other outreach and education material, it is hoped that the site will become and even more useful, accessible resource.

Efforts will also be made to have commercial internet sites provide information on mercury.

2.2.1 Populations of Special Concern

The Outreach and Education Committee considered populations of special concern to be those most vulnerable to mercury exposure. These populations would be the highest priority for outreach and education.

PREGNANT WOMEN

Methyl mercury can be passed easily across the placenta to the fetus, resulting in neurological disorders.

Information communicated:

- Basic education message above
- Stress impacts of mercury on development of fetus

Communication channels and mechanisms:

- TV news programs
- Materials/ information provided through OBGYN's and family doctors
- State agencies could partner with community health organizations to develop culturally appropriate material for non-English speaking populations
- Internet

Examples of existing material:

- DEP, DPH, MWRA mercury fact sheets
- Health Care Without Harm materials

WOMEN OF CHILDBEARING AGE

Methyl mercury can be passed easily across the placenta to the fetus, resulting in neurological disorders. Neurological disorders can occur during the earliest stages of pregnancy, before a woman may be aware that she is pregnant.

Information communicated:

- Basic education message above
- Stress impacts of mercury on development of fetus, particularly in the earliest stages of pregnancy

Communication channels and mechanisms:

- TV news programs
- Materials/ information provided through OBGYN's, family doctors and internists
- State agencies could partner with community health organizations to develop culturally appropriate material for non-English speaking populations
- Internet

Examples of existing material:

- DEP, DPH, MWRA mercury fact sheets
- Health Care Without Harm materials

PARENTS OF YOUNG CHILDREN

Information communicated:

- Basic education message above
- Stress impacts of mercury on young children
- It is illegal for schools and offices to dispose of fluorescent bulbs and other mercury bearing waste as trash. Mercury bearing waste should be handled as hazardous material.

Communication channels and mechanisms:

- TV news programs
- Materials/ information provided through pediatricians
- Materials/ information sent home through schools
- Internet

Examples of existing material:

Specific materials targeting this population were not identified. Materials for other target audiences may be easily adapted to this use.

CHILDREN, ELEMENTARY AND SECONDARY SCHOOLS

In elementary schools, young children can be exposed if stockpiled mercury is released to the environment. Middle and high school science labs and art classrooms can have considerable stockpiles of unwanted chemicals, including mercury.

Information communicated:

- Basic education message above
- Fluorescent bulbs should be managed safely and recycled, not disposed of as trash
- The use of mercury in laboratories, janitorial supplies, and clinics should be eliminated or reduced. Mercury waste should be recycled to the maximum extent possible.

Communication channels and mechanisms:

- Outreach to school science teachers, principals, school nurses, and school facility managers
- DPH School Indoor Air Quality Inspections
- Inserts in DPH Indoor Air Quality Reports
- Environmental Affairs Secretary Bob Durand school visits
- Inserts in teacher packages delivered with the Secretary's visit
- Workshops with administrators, teachers and janitorial staff
- Addition to science curricula
- Internet

Examples of existing material:

- DPH Indoor Air Quality Program materials
- OTA Environmental Management Guidebook for Schools, currently in draft form
- Poster and other material from Indiana Mercury Awareness program
- Wisconsin curriculum, "Mercury in your Environment" for high school students
- King County, Washington, "Rehab the Lab" Booklet
- Vermont Chemical Management Plan for schools

FISHERMEN

Those who fish in Massachusetts freshwater bodies and eat their catch (with the exception of stocked fish) are potentially at risk of mercury exposure and would not be systematically identified by the medical community. Through education and outreach, the dangers of consuming contaminated fish can be communicated.

Information communicated:

- Basic education message above, with particular emphasis on fish consumption advisories

Communication channels and mechanisms:

- TV news programs
- EOEA Education Advisory Committee
- Coordinated effort of DPH, DFWELE, and DEP, as part of the effort of the Interagency Committee on Fish Toxics Monitoring and Assessment
- Municipal Boards of Health
- Non-profits, such as Trout Unlimited
- Bait and tackle shops

Examples of existing material:

- DPH posters listing fish consumption advisories (multi-lingual)
- DPH web site

CULTURAL USERS OF ELEMENTAL MERCURY

Some cultures use elemental mercury for ritualistic purposes.

Information communicated:

- Basic education message above, with particular emphasis on the impacts of exposure to elemental mercury

Communication channels and mechanisms:

- EOEA's Environmental Justice Program, DPH and DEP, working cooperatively with community health centers, will determine the most appropriate venue and form for outreach.

Examples of existing material:

- Connecticut Department of Health, in cooperation with local health centers, has developed pamphlets on the cultural use of mercury in both Spanish and English.
- Internet

2.2.2 Populations and Institutions for Outreach and Education

GENERAL PUBLIC

Information communicated:

- Basic education message above
- Use fluorescent bulbs, but recycle them
- Ask your school system if mercury is still being used in science classes. If it is, encourage the school to switch to non-mercury alternatives.
- Ask your school system about past mercury use. Does mercury remain in the school? If so, it should be recycled or disposed of as a hazardous material.

Communication channels and mechanisms:

- State-sponsored mercury awareness week, including a poster contest and some combination of the elements below
- TV news programs
- Public service announcements
- Transit advertisements
- Newspaper articles, particularly in health and science sections
- Publications of non-profit organizations
- Point of purchase information on mercury-containing products at hardware stores and pharmacies
- Inserts for packages of information distributed by real estate agents to new homeowners
- Internet

Examples of existing material:

- Mercury fact sheets developed by DEP, DPH and MWRA
- Posted fish advisories at water bodies
- DEP, DPH, and MWRA websites

MEDICAL COMMUNITY (PEDIATRICIANS, OBGYN'S, INTERNISTS, FAMILY DOCTORS, HOSPITAL ADMINISTRATORS, PURCHASING OFFICES, LABS)

The medical community is in unique position to educate at-risk populations, including pregnant women, young children, and, through community health centers, cultural users of elemental mercury. In addition, the medical community itself uses many products containing mercury. It is important that the community be educated on the risks, proper management of, and alternatives to mercury products.

Information communicated to clinical and laboratory staff:

- Basic education message above
- Be aware of breakage and spill cleanup procedures
- Dispose of fluorescent bulbs properly by recycling

- Notify pregnant women and parents of young children of the Massachusetts fish consumption advisory.
- Use non-mercury blood pressure equipment, thermometers, and other medical devices.
- Ask manufacturers for non-mercury or low-mercury reagents and stains

Communication channels and mechanisms:

- Grand Rounds- DPH educational programs for the medical community at hospitals, packages of public health information could be distributed
- Massachusetts Medical Association and specialty conferences
- Bay State Clinical Lab Managers Association
- Massachusetts Hospital Association conferences
- Massachusetts League of Community Health Centers
- Medical schools- include information on mercury management and health impacts in curriculum
- Medical journals
- Continuing education of primary care physicians, nurses, and other clinical professionals
- Non-profit organizations, including Physicians for Social Responsibility and Health Care Without Harm.
- Speakers' bureau- to be composed of experts on various aspects of mercury, available to speak at meetings and other functions
- Internet

Information communicated to other hospital community members:

- Basic education message above
- Include flow diagram from Mercury Management Handbook
- Be aware of breakage and spill cleanup procedures
- Dispose of fluorescent bulbs properly by recycling
- Purchase non-mercury blood pressure cuffs, thermometers, batteries, and non-mercury or low-mercury reagents and stains.
- Use mercury-free cleaning products, including bleach.

Communication channels and mechanisms:

- Massachusetts Hospital Association conferences
- Massachusetts League of Community Health Centers
- Professional associations of hospital personnel
- Continuing education of primary care physicians
- Non-profits organizations, including Physicians for Social Responsibility and Health Care Without Harm.
- Speakers' bureau- to be composed of experts on various aspects of mercury, available to speak at meetings and other functions
- Internet

Examples of existing material:

- MWRA/MASCO Mercury Management Handbook
- EPA Region 5 Hospital Handbook
- Health Care Without Harm material

- Hospitals for a Healthy Environment (AHA-EPA MOU) material
- UMass Lowell Sustainable Hospitals Project website

DENTAL COMMUNITY

Through their use and disposal of mercury amalgam, dentists potentially release mercury into the environment. The strategy seeks to educate dentists about the environmental consequences of improper disposal and best management practices. By adopting best management practices, these releases can be minimized.

Information communicated:

- Basic education message above
- Phase out bulk amalgam- use pre-capsulated
- Best management practices as described in the MWRA brochure for dentists

Communication channels and mechanisms:

- Massachusetts Dental Association- conferences and publications
- Dental schools- include information on mercury management in curriculum
- Brochures developed for dentists
- Internet

Examples of existing material:

- MWRA brochure
- DEP brochure

COMMUNITY HEALTH CENTERS AND SOCIAL WORKERS

Community health centers and social workers may be able to reach some of the populations of special concern, particularly subsistence fishermen and cultural users, regarding the health impacts of mercury.

Information communicated:

- Basic education message above, with particular emphasis on fish consumption advisories
- See Medical and Dental communities

Communication channels and mechanisms:

- TV news programs
- Work with community health centers, possibly through the Massachusetts League of Community Health Centers, to develop materials for their clients
- Internet

Examples of existing material:

- DPH information on fish consumption advisories
- Connecticut Department of Health, in cooperation with local health centers, has developed pamphlets on the cultural use of mercury in both Spanish and English.

MUNICIPAL OFFICIALS AND LOCAL BOARDS OF HEALTH

Municipal officials and local boards of health are potentially important partners in collecting products that contain mercury for recycling from municipal buildings, schools, and homes, and educating residents about the fish consumption advisories.

Information communicated:

- Basic education message above

Communication channels and mechanisms:

- Local Board of Health annual training seminars
- Cooperative education and outreach with the Massachusetts Municipal Association

Examples of existing material:

- Mercury fact sheets developed by DEP, DPH and MWRA
- Posted fish advisories at water bodies
- DEP, DPH, and MWRA websites

BUILDING INSPECTORS

Local building inspectors are in a position to educate building owners about the regulations and laws regarding mercury bearing waste, along with providing information about recycling opportunities.

Information communicated:

- Basic education message above
- Thermostats, fluorescent bulbs, electric switches and other mercury-bearing products should be removed and disposed of as hazardous waste before building demolition.

Communication channels and mechanisms:

- Identify trade organizations, work through them to communicate message
- Internet

Examples of existing material:

- Burlington Board of Health material

UNIVERSITIES

Fluorescent bulbs, thermostats, and other mercury containing devices in university buildings are regulated as hazardous waste. Universities may also use mercury in laboratory experiments.

Information communicated:

- Basic education message above
- Fluorescent bulbs should be managed safely and recycled, not disposed of as trash
- The use of mercury in laboratories, janitorial supplies, and clinics should be eliminated or reduced. Mercury waste should be recycled to the maximum extent possible.

Communication channels and mechanisms:

- Workshops with administrators, professors, students and janitorial staff
- Internet

Examples of existing material:

none identified

CORPORATE ENVIRONMENTAL MANAGERS

Pro-active companies can play an important role in reducing the amount of mercury used in products and processes.

Information communicated:

- Basic education message above
- Identify sources of mercury at the facility- eliminate or reduce these sources.
- Once sources are addressed, make sure there is no residual mercury in traps and pipes. Clean traps and pipes or replace them, if necessary.
- Ask manufacturers for a certificate of analysis for all caustic and acidic chemicals. Request that these chemicals be mercury-free.
- Review the company's inventory of raw materials to make sure that it does not include mercury.
- Understand the mercury flow diagram from MWRA/MASCO Mercury Management Handbook
- Be aware of breakage and spill cleanup procedures
- Dispose of fluorescent bulbs properly
- Use non-mercury cleaning products

Communication channels and mechanisms:

- Corporate environmental managers are frequently in contact with DEP staff on regulatory issues and OTA staff on TURA issues
- Work with the Northeast Business Environmental Network and other trade associations to communicate message
- Associations of environmental health and safety officers
- Internet

Examples of existing material:
none identified

OFFICE BUILDING AND FACILITY MANAGERS

Fluorescent bulbs, thermostats, and other mercury containing devices in office buildings and facilities are regulated as hazardous waste. Building and facility managers play an important role in ensuring that mercury bearing waste is managed safely.

Information communicated:
- Basic education message above
- Fluorescent bulbs should be managed safely and recycled, not disposed of as trash

Communication channels and mechanisms:
- Utility bill inserts
- Work with industry associations, such as the Institute of Real Estate Management, the Building Owners and Managers Association, the National Association of Industrial and Office Properties, the National Association of Real Estate Investment Trusts, the Greater Boston Real Estate Board, and the Division of Capital Asset management for state facilities, to communicate through seminars and newsletters
- Lamp wholesalers
- Cleaning and maintenance companies
- Internet

Examples of existing material:
none identified

HEATING VENTILATION AND AIR CONDITIONING (HVAC) CONTRACTORS, SUPPLIERS AND WHOLESALERS

The Thermostat Recycling Corporation (TRC) has begun operation in Massachusetts, providing free recycling of used mercury thermostats. Working in cooperation with HVAC contractors, suppliers and wholesalers, the amount of mercury collected for recycling from used thermostats could be substantially increased.

Information communicated:
- Basic education message above
- The Thermostat Recycling Corporation (TRC) will soon begin operation in Massachusetts. TRC provides free recycling of used mercury thermostats.

Communication channels and mechanisms:
- Trade conferences
- Unions
- Internet

Examples of existing material:

- FL, IL, IN, IO, MI, MN, ND, OH, and WI have had TRC in place for several years now. Their web pages have information on TRC; TRC also has information available.

PLUMBERS AND ELECTRICIANS

Plumbers and electricians install and remove sump pumps, thermostats, flow meters, switches, and other mercury containing devices. It is important that they are informed about proper disposal practices and non-mercury alternatives.

Information communicated:

- Basic education message above
- Information on the Universal Waste Rule and recycling locations
- Information on performance and cost of non-mercury alternative devices

Communication channels and mechanisms:

- STEP fact sheets describing performance and cost issues for non-mercury devices could be developed.
- Trade conferences
- Unions

Examples of existing material:

none identified

DISMANTLERS OF CARS AND WHITE GOODS

Cars and white goods (washing machines, refrigerators, etc.) often contain mercury switches. If the switches are not removed prior to recycling or crushing, mercury can be released into the resulting "fluff." Secondary smelters, melting the waste metal, may then release mercury with their air emissions.

Information communicated:

- Basic education message above
- Mercury switches should be removed from cars and white goods prior to dismantling and crushing.

Communication channels and mechanisms:

- Outreach brochures, informational sessions
- Internet

Examples of existing material:

none identified

WILDLIFE ADVOCATES

Wildlife advocates can potentially provide strong support for broad-based efforts to virtually eliminate the use and release of anthropogenic mercury.

Information communicated:

- Basic education message above
- Impacts of mercury on wildlife

Communication channels and mechanisms:

- TV news programs
- Internet

Examples of existing material:

- Fish consumption advisories

2.3 RESEARCH AND MONITORING

The Gap Analysis and Research Committee developed a general outline of areas of ongoing research and monitoring with proposed areas for expansion and proposed new activities. Activities are outlined for four component parts of the agenda: general research, sources, sinks, and the fate and transport of mercury.

Activities in the "sources" category seek to monitor and evaluate mercury before release occurs into the environment. Research activities in this area will also seek to identify and develop new methods for eliminating or limiting the use and release of mercury.

Activities in the "sinks" category are aimed at studying and assessing mercury concentrations in and impacts on environmental receptors, including air, soil, water, wildlife and humans.

Activities in the "fate and transport" category focus on how mercury moves through the environment from the point of its release and deposition, to its possible entry into and movement through the food web.

An indication of each activity's current status is provided as ongoing, currently planned, or newly proposed. The Gap Analysis and Research Committee also indicated which ongoing activities it felt should be expanded or were in need of increased resources. Additional resources could be comprised of funding from the state, federal government and private institutions. It should be noted that the collection, management and synthesis of the data developed as a result of research and monitoring will require additional staff time and resources. Research projects were identified as planned for fiscal year 2001, recommended for completion in the short term and recommended for completion in the long term.

The research and monitoring agenda has three goals:

1. To establish an integrated and comprehensive database on mercury in Massachusetts,

2. To enhance Massachusetts' capacity to address critical public health and environmental issues related to mercury, and

3. To conduct research and monitoring in support of Massachusetts' efforts to eliminate the use of anthropogenic mercury and its release to our air, water and land and to evaluate the effectiveness of programs that address mercury.

2.3.1 General Research

Environmental Information Management Group

Ongoing, expanded efforts would require additional support

The Environmental Information Management Group was formed in 1999 as a subcommittee of the New England Governors' Conference Environment Committee. The Group's purpose is to develop data formats for mercury information that will facilitate sharing this information among states and federal agencies. The Group includes representatives from the New England states and EPA Region 1; DEP is an active participant. The Massachusetts Mercury Task Force will review the recommendations of this project.

New England Goals and Indicators Partnership

Ongoing, expanded efforts would require additional support

The New England Goals and Indicators Partnership is an ongoing collaborative effort between EPA Region 1 and the New England states. The Project's goal is to identify indicators of environmental health, broadly defined as both indicators in the natural world, such as chemical concentrations in mussel tissue, and indicators of mercury releases, such as mercury levels in emissions from coal-fired power plants. DEP is actively participating in this project.

Coordinate mercury research and activities in Massachusetts

Ongoing, expanded efforts would require additional support

Government agencies, universities and research institutions in Massachusetts would be surveyed for research and monitoring activities around mercury. These activities would then be coordinated to promote information sharing and efficiency of effort. This would be accomplished by means of periodic meetings of researchers, a web site, a list serve, or other methods.

Mercury Strategic Research Program

Proposed, Short term

This program would fund discrete research projects on the fate, transport, sources, control and impact of mercury in the environment. Important questions remain regarding the movement of mercury through the food web, early indicators of potential mercury exposure in biota, impacts of mercury exposure on wildlife, total exposure of mercury to humans, and other issues. This program would identify issues and foster research to address the questions raised. The program would also take advantage of and create efficiencies between research and monitoring. Research can be optimized by adequate monitoring data, which will be collected as a result of other efforts, and monitoring can be optimized as a result of careful research.

Survey ongoing research and monitoring efforts for opportunities to expand current scope to include mercury
Proposed, Short term

Potential opportunities exist to expand existing research and monitoring efforts in areas such as acid rain and with the monitoring of wildlife, among others, to include mercury monitoring and research. Expanding existing research and monitoring efforts would be less costly than establishing similar efforts to investigate mercury alone.

2.3.2 Sources of Mercury

ESTABLISH BASELINES AND TRENDS

Mercury Release Sources

Massachusetts' inventory of mercury release sources will be made more complete by monitoring emissions and discharges and/or by collecting and evaluating existing data from other institutions and agencies from the following sources:

- Quarterly monitoring of municipal waste combustors
  Ongoing

  Quarterly monitoring of municipal waste combustors is underway.

- Publicly Owned Treatment Works (POTW's)
  Ongoing, expanded efforts would require additional support

  Data on mercury in waste water and sewage sludge is currently available from MWRA, with limited data available from other POTW's. POTW's represent a potentially large source of mercury releases; regulatory limits and enforcement vary.

- Direct discharges from hospitals, laboratories, dentists and federal facilities
  Ongoing, expanded efforts would require additional support

  Limited monitoring has been conducted in Massachusetts on this source.

- Septage
  Ongoing, expanded efforts would require additional support

  Limited data on mercury in septage from on-site, residential septic systems has been generated by MWRA.

- Annual monitoring of medical waste incinerators
  Planned

  Annual monitoring of medical waste incinerators is planned

- Annual monitoring of sludge incinerators
  Proposed, Short term

- Ash from coal burning utilities and municipal waste combustors
  Proposed, Long term

  Research into the actual mercury content of products made from bottom ash should be conducted, including evaluating the emissions from such products into ambient air or water run off. Special attention should be paid to roadway surfacing materials and building materials including gypsum board.

- Landfills
  Ongoing in other states

  Studies in Florida and New Jersey indicate that mercury gas emitted from landfills may prove to be a significant long-term source of emissions. No studies of mercury in landfill gas have been conducted in Massachusetts to date. Massachusetts, working through the Regional Mercury Task Force, will continue to monitor and evaluate on-going Florida studies.

- Dismantlers, Secondary Smelters
  Ongoing in other states

  Dismantlers of vehicles and appliances, as well as secondary smelters that recycle the metal from vehicles and appliances, release mercury into the environment if mercury switches are not properly removed and disposed. No studies have been conducted in Massachusetts on the extent of this source. Within the Regional Mercury Task Force, New York and New Jersey are taking the lead in researching and evaluating mercury releases from these sources. Massachusetts will monitor the progress of their efforts.

- Crematoria
  Ongoing in other states

  Crematoria emit mercury primarily as a result of dental fillings in corpses. Minnesota and New Jersey have been investigating emissions from this source. Massachusetts is monitoring their results through the Regional Mercury Task Force. No studies have been conducted on this source in Massachusetts.

- Veterinary Uses
  Ongoing in other states

  Veterinarians use mercury for similar purposes as hospitals. Animal medicine, ointments and vaccines often contain mercury. Mercury is also released when animals are cremated. No studies have been conducted on this source in Massachusetts.

- Wood Burning Stoves
  Ongoing in other states

  Wood burning stoves emit mercury because wood contains mercury. Maine is taking the lead in investigating this source. Massachusetts will continue to monitor Maine's progress through the Regional Mercury Task Force. No studies have been conducted on this source in Massachusetts.

Update the inventory of mercury release sources in Massachusetts

Planned, Short term

As new regulations for municipal waste combustors and other sources go into effect, DEP will update the inventory of mercury release sources in Massachusetts.

Collect baseline data on amount of mercury in products and processes

Ongoing, expanded efforts would require additional support

Massachusetts agencies will coordinate with federal authorities, including, but not limited to, EPA, FDA, and the Bureau of Mines to collect information on the mercury content in products and processes. Agencies will also look to other information sources, including Vermont, Minnesota, and European countries, for this information. Some of the products and processes that will be researched include:

- Stockpiles at federal facilities, manufacturers, schools, and dental offices
- Cosmetics and other products containing thimerasol
- Bleach and other cleaning products
- Pigments
- Flat LCD display screens

- Special paper coating
- Games, toys, clothing, novelties
- Medication
- Reagents
- Manufacture of fluorescent bulbs and batteries

Database of mercury and products containing mercury being recycled

Ongoing, expanded efforts would require additional support

Working with mercury recycling firms, DEP will help create data of this nature. The Department's information base is expected to increase significantly as a result of the MWC source separation plans that are currently being developed.

Survey of mercury in hospitals

Proposed, Short term

Little data is available at present to develop a baseline for mercury use in hospitals. The American Hospital Association in conducting a survey; for a variety of reasons, this survey is expected to be of limited use in Massachusetts.

Efforts to obtain information on mercury use and disposal at Massachusetts hospitals could be developed as part of a larger program with incentives for hospitals to move away from mercury use. Such a program could include technical assistance to reduce red bag waste or grants to pay the difference between mercury and non-mercury equipment. Completing a survey on mercury use could be a pre-requisite for grant eligibility.

Analyze improved TURI data

Proposed, Long term

The Massachusetts Toxics Use Reduction Act (TURA) requires Massachusetts manufacturers and utilities to report specified chemicals used in the manufacturing process and in waste releases. TURA thresholds are based on federal thresholds for EPA's TRI program, which only requires reporting for specified chemicals in waste releases.

In 1999, the reporting mercury threshold for the federal program was lowered for 10,000 pounds per year to 10 pounds per year. For the first time, manufacturers will report at this level for the period of January through December, 2000. It is expected that the first year's data will be incomplete, however, and that the first full data set will be reported for 2001. Federal TRI data for 2001 will be available in late 2002; Massachusetts TURI data for 2001 will be available in early 2003.

The improved data will help identify manufacturers that use mercury, so that possible alternative processes can be investigated. The improved data will also provide the most reliable, complete monitoring of mercury releases from utilities to date.

DEVELOP OR PROMOTE METHODS TO ELIMINATE AND REDUCE THE USE AND RELEASE OF MERCURY

The development and commercialization of substitutes for mercury and of new technologies for monitoring, control, and remediation are important components of the Zero Mercury Strategy. Through the STEP Program, EOEA, DEP and MWRA have all been involved in evaluating and supporting Solmetex, a company that develops and markets technology which separates mercury from waste water. The STEP process will be used to support the development and commercialization of non-mercury based technical solutions.

Alternative Products

Ongoing, expanded efforts would require additional support

In conjunction with the Education and Outreach Strategy, various users of products containing mercury, including HVAC contractors, plumbers, electricians, the medical community and others, may identify some non-mercury substitutes as technically unsatisfactory. Through the STEP Program, these concerns can be addressed by research to develop non-mercury alternatives that are comparable in performance and cost.

The more restrictive TURA and TRI thresholds will likely identify additional products containing mercury. Alternatives for these products can then be identified or developed. The Center for Sustainable Hospitals at the University of Massachusetts has developed a database of non-mercury products for hospitals; this database could be expanded.

Develop innovative technology for emissions and discharge control, including waste water treatment

Ongoing, expanded efforts would require additional support

Research green chemistry

Ongoing, expanded efforts would require additional support

Green chemistry focuses on removing toxins at the molecular level. The Green Chemistry Lab, at UMass Boston, is affiliated with the STEP Program and engages students to solve specific, real world problems. Recommendations will be developed to study products and processes that use mercury, where there is no apparent substitute.

Evaluate emission limits for remaining mercury sources, including sludge incinerators

Ongoing, expanded efforts would require additional support

Development of alternative technologies for hazardous waste site remediation

Ongoing, expanded efforts would require additional support

Hazardous waste sites can release mercury to the environment through water, air, or soil. Methods of better remediating sites to control the release of mercury are being researched. Options to expand efforts in this area will be evaluated.

Process Redesign

Proposed, Long term

With improved information manufacturers' use of mercury available through TURA, research can begin to redesign these processes. Continuous emissions monitoring technologies, now under development, should provide companies with instant feedback, helping identify opportunities for reducing mercury emissions and discharges.

2.2.3 Sinks for Mercury

ESTABLISH BASELINES AND TRENDS FOR ENVIRONMENTAL RECEPTORS

NOAA Status and Trends Program- Musselwatch

Ongoing

Musselwatch is a program of the National Oceanic and Atmospheric Administration in which CZM participates. Contaminants, including mercury, are monitored in mussel tissue and sediments at selected sites around the United States.

Gulfwatch Program

Ongoing, expanded efforts would require additional support

Similar to the Musselwatch program of NOAA's Status and Trends program, Gulfwatch is a program supported by the Gulf of Maine Council, where states rimming the Gulf of Maine participate in a monitoring program that measures contaminants of environmental concern, including mercury, in tissues of Mytilus edulis (the blue mussel). Continued funding for this program is currently tenuous.

USGS National Water-Quality Assessment Program
Ongoing

The National Water-Quality Assessment (NAWQA) Program New England Coastal Basins Studies are beginning a mercury survey program for river bed sediment and fish with the goal to better define a sampling plan for mercury in the New England Coastal Basin.

MWRA Outfall Testing of Fish Tissue
Ongoing

In conjunction with the construction of the outfall pipe in Massachusetts Bay, MWRA has been conducting and will continue to conduct testing of fish tissue around the outfall area. Tests include sampling for mercury content.

Interagency Committee on Fish Toxics Monitoring and Assessment
Ongoing, expanded efforts would require additional support

The Interagency Committee on Fish Toxics Monitoring and Assessment, composed of DEP, DFWELE, and DPH, was formed in 1992, in response to ongoing requests from the public to test freshwater fish from Massachusetts' water bodies for toxins known to bioaccumulate in fish, including mercury. Each year, the Committee selects a given number of water bodies to test based on public requests received and established ranking and selection criteria.

There are over 4,700 water bodies in the state, and only 189 have been tested. There are 80 freshwater fish consumption advisories for mercury and 97 in total. Recently, extensive testing has been conducted through in the Merrimack Valley, where existing models predict relatively high levels of mercury to occur.

DEP Atmospheric Deposition Monitoring Stations
Ongoing, expanded efforts would require additional support

Three atmospheric deposition monitoring stations belonging to DEP exist. Due to funding constraints, only one is operating intermittently. Improved deposition monitoring is important to evaluating trends in the effectiveness of state, regional and national mercury reduction efforts. Options to expand monitoring will be explored.

Coastal 2000
Planned, FY 2001

EPA and CZM, through partnering with UMass, will collect and analyze sediment and fish tissue in Massachusetts estuaries (40 stations/year for two years) for a myriad of contaminants, including mercury.

Test wildlife tissue for mercury concentration

Proposed, Short term, expanded efforts would require additional support

In Massachusetts, eagles chicks are tested by state agencies on a regular basis, and a project is now underway through Tufts University to look at loons. These tests could be expanded to include routine testing for mercury. Testing could also be conducted on other species for which fish is a primary food source, including otters, osprey, kingfisher and mink.

Monitor marine mammals, including beached whales, for mercury concentrations in tissue

Proposed, Short term

Tissue samples are routinely collected from beached whales by the New England Aquarium and are available for testing. They have never been analyzed for mercury or other heavy metals dues to lack of funding.

Participate in the development of a regional fish and wildlife mercury database

Proposed, Short term

The Regional Mercury Action Plan specifies that a regional database containing information on mercury concentrations in the tissue of fish and wildlife should be created. Massachusetts agencies will assist in creating and will contribute to this database.

Research early biotic indicators

Proposed, Short term

Benthic bacteria or phytoplankton would be studied to evaluate their potential for use as early biotic indicators of elevated mercury levels in fish.

Sediment and core samples

Proposed, Long term

Core samples would be studied to determine trends in mercury concentration in sediment over time. Archived core samples may be available through USGS.

EXPOSURE TO AND IMPACTS OF MERCURY

Research the extent and impact of subsistence fishing

Ongoing, expanded efforts would require additional support

DPH has done some work with subsistence fishing populations in Massachusetts. As this population is particularly at risk from mercury exposure, it is important to identify the size, location and characteristics of those who practice subsistence fishing.

Research the extent and impacts of the cultural use of mercury

Proposed, Short term

In conjunction with an outreach and education strategy to cultural users of mercury, the extent and impacts of cultural use will be examined.

2.3.4 Fate and transport of mercury

Evaluate viable mercury dispersion models and their application to Massachusetts.

Ongoing, expanded efforts would require additional support

The further development and evaluation of mercury dispersion models for use by researchers and regulators was identified as an action step in the Regional Mercury Action Plan. Funded by EPA and the Connecticut Department of Environmental Protection, the University of Connecticut is currently in the process of developing such a model. Other models also exist. Massachusetts will support further efforts to develop, evaluate and apply such models.

2.3.5 Research Programs

The Commonwealth of Massachusetts maintains several research programs that will be utilized in implementing various aspects of the mercury research and monitoring strategy.

Toxics Use Reduction Institute (TURI)

The Toxics Use Reduction Institute (TURI) is a multi-disciplinary research, policy and education center established by the Massachusetts Toxics Use Reduction Act of 1989. TURI sponsors and conducts research, organizes education and training programs and provides technical support to promote reduction in the use or generation of toxic chemicals in the state's industry and commerce.

Massachusetts Strategic Envirotechnology Partnership (STEP)

STEP is a unique collaboration of the Executive Office of Environmental Affairs and the University of Massachusetts system. STEP effectively helps develop and promote technology-based solutions to environmental challenges across the Commonwealth. Current STEP technologies under consideration include a surface discharge UV light that does not contain mercury and can be used for paint stripping and a low cost, continuous stack emissions monitoring device that can detect low levels of mercury and other metals.

DEP Office of Research and Standards

The Office of Research and Standards (ORS) was created in 1980 to provide information on the adverse impacts of environmental contaminants and to make recommendations for protecting public health and the environment. ORS performs research, develops guidelines for protecting public health, conducts risk assessments, recommends science-based strategic priorities for DEP, and works with DEP programs on developing and applying risk management criteria for protecting public health and ecosystems.

DPH Bureau of Environmental Health Assessment

The Bureau of Environmental Health Assessment (BEHA) has a broad mission of protecting the public health from a variety of environmental exposures. The BEHA responds to environmental health concerns and provides communities with epidemiological and toxicological health assessments. The BEHA provides fish advisories and information to the public on environmental health and medicine.

Appendix A
OVERVIEW OF MERCURY REDUCTION STRATEGIES IN MASSACHUSETTS TO DATE

1. SOURCES OF MERCURY

1.1 Products Containing Mercury

DEP provides grants to municipalities for universal waste sheds, which can be used for the collection of mercury-added products. FY 1999 was the first year these sheds were offered as part of DEP's grant program; over 30 sheds have been provided.

EOEA and DEP have funded and are extending a universal waste project through UMass Amherst, which established mercury product recycling programs, distributed mercury safety kits, and information on alternative products to 21 Western Massachusetts municipalities.

DEP funded school cleanout and chemical management programs in 10 Franklin County school laboratories and in several other western Massachusetts towns as part of a UMass Universal Waste grant. As part of the projects fluorescent lamps were collected for recycling and chemical management, inventory, and purchasing policies were instituted. This year the agency is working with the city of Springfield to fund more such school collections and cleanouts. In addition, DEP has inspected 16 schools in the northeast region of the state to identify compliance issues and to increase awareness of safe chemical management practices, including those for mercury.

DEP is working with NEWMOA and EPA to audit the mercury management practices of federal facilities in the region to promote source reduction /separation efforts. Specific guidance material will be developed for federal facilities as part of this project.

The Lexington Minuteman Household Hazardous Products Facility is a permanent collection site for mercury-added products and other hazardous household products. The Facility serves 12 surrounding towns and small businesses; its construction was financed by DEP and the Executive Office of Environmental Affairs.

Beginning in 2000, DEP has expanded its HHP grants as part of a multi-year effort to encourage the establishment of permanent programs across the state. In May 2000, a Quincy HHP facility opened for operation. Construction of this facility was partially funded by a DEP grant. In FY 2000, DEP has made grants to other programs that are developing permanent HHP facilities: the Charles River Consortium (which will serve 10 towns and is scheduled to open in Fall 2000); the North Brookfield Facility (which is expected to serve 7-8 towns); and the Southern Berkshire Solid Waste Management District (which is planning to serve 13 towns with a permanent facility in Lee as well as a mobile collection service).

DEP is funding a project by the town of Burlington to conduct thermometer collection/replacement in conjunction with local pharmacies. Many Massachusetts municipalities hold annual household hazardous products collection days, where mercury-added devices are encouraged and accepted.

OSD, with assistance from DEP, has developed a mercury recycling contract for municipalities and state agencies. The Department promotes its use by communities in regularly scheduled grant outreach meetings and at its annual HHP Conference.

1.2 Medical and Dental Facilities

OPERATIONAL SERVICES DIVISION (OSD): STATE PROCUREMENT

The Environmentally Preferable Purchasing Program at the Operational Services Division is committed to reducing procurement of mercury-containing items through its contracts. Low-mercury fluorescent light bulbs are available through a state contract, as is fluorescent bulb recycling services. OSD also includes water treatment chemicals free of trace mercury in its water treatment chemical contract. The Medical Procurement Management Team at the Operational Services Division is awarding points in bids for dental suppliers who supply mercury-free amalgam substitutes and will be investigating other ways to implement mercury reduction in its contracts. Mercury-free thermometers and blood pressure equipment is already available on state contract.

DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)

DEP has a grant from EPA to audit hospitals, focusing on mercury, hazardous, and medical waste source and volume reductions. The agency has developed an enforcement discretion policy to encourage hospital participation.

Through the Regional Mercury Task Force and NEWMOA, DEP has developed model mercury product stewardship draft legislation that addresses mercury products used by healthcare facilities. The draft will undergo initial public review at regional meetings scheduled in December.

DEP worked with Health Care Without Harm and Beth Israel Deaconess Hospital (BID) to plan and implement a Mercury Thermometer Exchange /Collection for BID employees at three campuses. Over 1,000 thermometers were collected and exchanged. BID pledged to eliminate mercury-containing blood pressure cuffs and established battery collection programs.

DEP is participating in the Regional Mercury Task Force effort to persuade JCAHO, the hospital accrediting agency, to adopt policies that promote mercury source reduction and recycling.

The Regional Mercury Task Force and DEP will evaluate mercury "stocks" in products.

DEP is participating in the AHA/EPA workgroup to develop evaluation measures for source reduction, and remains involved in ongoing outreach to hospitals

The Regional Mercury Task Force and DEP will address mercury emissions from autoclave and other sterilization facilities.

DEP remains involved in enforcement efforts with incinerators, including a SEP.

DEP is working with Stericycle and the Mass. Dental Society to establish statewide collection for unused elemental mercury stocks and to raise environmental awareness among dentists.

DEP participated in EPA's development of a Supplemental Environmental Project for an enforcement case against the NESWC municipal waste combustor in North Andover. This project requires the facility operator to conduct mercury reduction work with hospital facilities in its service area. In addition, DEP has required Supplemental Environmental Projects in resolving two enforcement cases against health care facilities. Both projects require the facilities to reduce their use of mercury.

MASSACHUSETTS WATER RESOURCES AUTHORITY (MWRA)

Hospitals

The five-year Massachusetts Water Resources Authority (MWRA)/ Medical And Scientific Community Organization (MASCO) Mercury Work Group, a cooperative effort between TRAC and area hospitals and medical facilities to reduce the discharge of mercury-containing products from hospitals to the sewer system, was formally concluded in fiscal year 1999.

The MWRA/MASCO Mercury Work Group identified mercury in many products that have commonly been used in hospitals and other medical facilities, such as blood test reagents and cleaning products. The work group has actively researched mercury-free alternatives to many of these products, and developed a mercury products database that is available to area hospitals and other interested parties.

During fiscal year 1999, the work group completed the final report, the Mercury Management Guidebook, which provides a comprehensive, practical guide to finding and eliminating mercury sources in hospitals and medical labs. See Appendix C for a detailed description. MWRA is continuing to work extensively with MASCO, which represents the Longwood-area medical facilities, on these studies. Reports of the workgroups can be found on-line at the MASCO web site (www.masco.org). MWRA/MASCO has developed guidance documents for facilities detailing mercury compliance problems.

A key factor in gaining the cooperation of facilities in the workgroup has MWRA's mercury "safe harbor" program. Under this program, initiated in March 1997, MWRA will not escalate enforcement (beyond enforcement orders) against companies that have non-compliant mercury discharges, provided they actively participate in the program and demonstrate progress in reducing their mercury discharges. MWRA has

divided its non-compliant mercury dischargers into two groups. Group 1 consists of sewer users whose discharge contains 0.004 mg/l or less of mercury; Group 2 consists of sewer users whose discharge contains more than 0.004 mg/l of mercury. Each of these sewer users has been issued an enforcement order, which outlines the safe harbor requirements. Facilities that operate outside the safe harbor will be subject to escalating enforcement including monetary penalties. MWRA is now considering modifying the terms of the "safe harbor" program.

To date, MWRA's efforts have resulted in a significant decrease in mercury concentrations from these facilities. The 29 major hospitals and medical centers (representing 55-57 individual sampling locations) were a major source of mercury from MWRA's permitted users. Seventy-seven percent of these sampling locations have achieved compliance (1 part per billion or less), and only 9% (5 locations) remain above 4 parts per billion on a consistent basis. Average mercury discharge concentrations from these hospitals dropped from 22 ppb in fiscal year 1994 to 2 ppb in fiscal year 1999. Mercury levels in MWRA fertilizer pellets are currently at some of the lowest levels recorded since the program began, roughly 50% below the DEP's most stringent standard for beneficial reuse of biosolids.

MWRA also worked closely with the state's Strategic Envirotechnology Partnership (STEP) Program and the Office of Technical Assistance (OTA) to complete full-scale pilot testing of several promising mercury treatment systems at two Boston-area hospitals. STEP researchers at UMass-Boston indicate that the preliminary results of these studies show that the technologies can be effective in reducing mercury levels in clinical lab waste streams to meet MWRA compliance standards).

Dental Facilities

MWRA is continuing work with the Massachusetts Dental Society, Tufts Dental School, and local dentists to (a) increase awareness of the environmental impacts of dental amalgam discharge (a typical amalgam can contain up to 50 percent of mercury); (b) promote preferred dental "housekeeping" practices; and (c) pilot test amalgam separators.

MWRA is also closely monitoring the outcome of several other dental facilities studies from other POTWs, (primarily in the Great Lakes states) to determine what removal/reduction techniques are most successful. Sampling of area dental facilities indicates that these dischargers contain high loads of mercury and other metals which result from the installation and removal of dental amalgam. This percentage is consistent with studies done at several other POTWs nationally, and is roughly equivalent to the amount contributed by all other facilities sampled by MWRA. The executive summary of this report is available at www.mwra.state.ma.us under the Toxic Reduction and Control section on publications (go to "Doing Business with MWRA").

Education and outreach is a key element to MWRA's dental amalgam control program. MWRA staff, at times accompanied by DEP staff, made nine appearances at Massachusetts Dental Society sponsored events, including the 1999 Yankee Dental Congress, and distribute a guidance document, "Dentistry and the Environment," which details ways dentists can reduce their discharge of mercury and other metals of

concern. This brochure is being distributed to dental facilities and other interested parties in the service area. In addition, TRAC presented dental study findings at health care conferences in Massachusetts and Minnesota to promote new approaches to dental practices that reduce discharges of toxic metals to the sewer system.

OFFICE OF TECHNICAL ASSISTANCE (OTA)

OTA assists hospitals with mercury reduction upon request as part of our regular assistance program. OTA also facilitates a Health Care Environmentally Preferable Purchasing Roundtable, a forum to facilitate communication between hospitals and state assistance agencies regarding, among other things, reduction of mercury use in health care. OTA publishes the Health Care Environmentally Preferable Information Exchange newsletter, which is issued every other month.

UMASS LOWELL SUSTAINABLE HOSPITALS PROJECT

The Sustainable Hospitals Project (SHP) of the Lowell Center for Sustainable Production (LCSP) at the University of Massachusetts at Lowell has set up a website that includes alternatives to mercury-bearing products used in health care. The SHP Project also provides in-hospital support to reduce environmental and occupational hazards, participates in the AHA/EPA EPP workgroup, and is active in the Massachusetts EPP Roundtable. SHP funding sources include grants from Merck, NIOSH, and the Massachusetts DEP.

1.3 Waste Facilities

MUNICIPAL WASTE COMBUSTOR RULE

The Municipal Waste Combustor Rule, promulgated by DEP in July 1998, requires facilities that burn at least 250 tons/day emit no more than to 28 ug/dcsm of mercury. This will achieve a reduction of between 75 and 90 percent in mercury emissions from these MWC's, the largest in-state source of mercury in Massachusetts. The MWC Rule also includes a provision requiring facilities to develop, fund and implement source separation plans for mercury-bearing wastes. The regulations require facilities to submit four quarters of data from inlet testing. The data will allow DEP to establish a baseline to evaluate the effectiveness of future reduction efforts.

MEDICAL WASTE INCINERATOR RULE

DEP is in the process of drafting a Medical Waste Incinerator Rule. See Chapter 2.

PUBLICLY-OWNED TREATMENT WORKS

Sewage treatment systems, known as "Publicly-owned treatment works" or "POTW's" are required to create Pretreatment Programs to regulate and prevent mercury releases into their systems from industrial sources. Mercury can be discharged in POTWs' effluent, and can enter their residuals. POTWs can only control some of the sources of mercury entering their system; some enters from aerial deposition, groundwater, and unregulated residential use. MWRA, Massachusetts' largest POTW, has developed pretreatment and source reduction programs that have substantially reduced mercury inputs from controllable sources.

1.4 Utilities

DEP has been involved in fact-finding with the Canadians and the northeast states on the level of control and in determining appropriate timeframes

Through its participation on the Regional Mercury Task Force, DEP has taken steps to link mercury reduction to the regional /national ozone transport issues.

1.5 Industry

The revisions to the state's Toxics Use Reduction Act (TURA) are expected to bring an enhanced focus to Persistent Bioaccummulative Toxins (PBT), including mercury. Significant features of the new Environmental Stewardship Act include a reporting threshold of 10 pounds per year for the use of particular PBT's like mercury as well as a increase in the fees paid by PBT users.

This increased focus on mercury will allow the state to gain a better understanding of how it is currently being used by Massachusetts manufacturers and how to best target the technical assistance resources of the TUR/Environmental stewardship program towards mercury elimination.

MWRA, as part of its safe harbor program, assessed loadings of mercury from industrial dischargers in the MWRA sewer service area.

MWRA/ MASCO has prepared guidance documents for industries detailing mercury compliance problems and has developed standards for replacing piping where mercury can accumulate over time.

The Universal Waste Rule, promulgated by DEP in 1997, encourages businesses to recycle mercury-containing wastes by streamlining the hazardous waste regulatory requirements.

2. OUTREACH AND EDUCATION

Education on mercury is being conducted by the Department of Public Health (DPH) regarding freshwater fish advisories. Fish advisories are mailed to all Boards of Health and suggests that the advisory be posted in the local newspaper. DPH provides posters explaining fish advisories to towns and suggests that they be posted at town hall and at the water body with the advisory. Posters have been translated into six languages, tailored to the needs of the community. DPH also conducts special educational sessions with Boards of Health, in which fish advisories may be a topic covered.

DPH conducts "Grand Rounds" at hospitals throughout the state, providing seminars for physicians. Mercury contamination in fish is sometimes an explicit topic covered; materials covering the fish advisories are always handed out.

In conjunction with the Department of Fish and Wildlife, posters on the fish advisories are posted at every location that issues fishing licenses. A telephone number to call for more information on fish advisories is included with every fishing license. DPH receives a number of calls through this number.

When the fish advisory for pregnant women was issued, DPH sent a mass mailing to all family physicians and obstetricians.

Two years ago, DPH conducted a survey of water bodies with fish advisories to see if posters on the advisory were still up. Most were. Last year, DPH conducted a survey in southeastern Massachusetts to see if advisory posters were up and to see who was fishing. Results will be available in the spring, 2000. Most postings at water bodies are not multilingual. DPH offers translation assistance to all local health departments in Massachusetts.

DEP has an "Answers" booklet addressing consumers most commonly asked questions about hazardous household products. The booklet includes information on mercury-added products like fluorescent lamps and batteries. This year DEP is offering a variety training programs for communities addressing the following topics: Universal Waste Collection Program Training, Safe Management of HHP, Hazardous Waste Basic Training, and a Higher Education Educational Roundtable. EOEA and DEP hold an annual HHP Forum, which includes presentations on the management of products containing mercury and the availability of mercury-related state grants and contracts. DEP has conducted outreach on mercury issues at local, regional, and national conferences, workshops, and forums. Through its own efforts and through grants to UMass and communities, educational materials have been developed to inform citizens about environmental and health impacts of mercury, available recycling options, safe cleanup procedures, and information on products which contain mercury as well as non-mercury alternatives

3. RESEARCH AND MONITORING

The following is a list of existing data and reports known to the Task Force on mercury in Massachusetts.

3.1 General

- DEP, "Mercury in Massachusetts," 1996
- Northeast States and Eastern Canadian Provinces Study, February 1998
- The EPA 1996 national report
- EPA-air deposition-2 stations in Massachusetts
- Mercury Study of Merrimack River Basin
- Historic sampling of 175 Water Bodies
- USGS-Sudbury River studies
- Great Lakes Binational Toxics Strategy, Mercury Sources and Regulations draft report, November 1999 update (http://www.epa.gov/glnpo/bns/mercury/stephg.html)

3.2 Fish and Wildlife

- Eagle Blood Samples (1982, Loons Otters, Fish, food chain)
- Gulfwatch and Mussel Watch programs, 1992- present
- MWRA outfall testing of fish tissues
- DMF- fish monitoring
- DEP- 1996 study to determine the variability of fish tissue monitoring in three areas of Massachusetts.
- Ongoing DEP assessments of fish tissue by watershed and other site specific work (18-20 areas/year). Includes sampling undertaken in response to public requests
- Interagency Committee for Freshwater Fish Monitoring and Assessment. In 1992, due to increased public demand for fish toxics monitoring data, DEP, DPH, and DFWELE, initiated a formal protocol for the public to request fish toxics monitoring surveys of the Commonwealth's water bodies.
- NESCAUM- possible fish consumption study
- EPA-sediment fish tissue-summer 2000

3.3 Waste Facilities

DEP:

- four quarters of MWC inlet data
- stack tests from MWC's
- stack tests from medical waste incinerators
- leachate data from landfills
- stack tests from sludge incinerators
- no data from septic systems, haulers or transfer stations

MWRA:

- plant effluent data
- mass balance data
- septage data
- tracking average concentrations for 30 hospitals
- data from dental studies

3.4 Medical and Dental Facilities

The MWRA Mercury Project produced a list of substances and products containing contaminant mercury used in health care facilities. Minnesota and the EPA, as well as other sources, have lists of mercury products used in health care.

Quarterly reports are available on purchases by state facilities, but personnel would be needed to comb through them for evidence of mercury purchases. No aggregate data is available for purchases by other facilities. The American Hospital Association is planning to do a survey with the EPA, but the results from that may not be available for a year. The Environmental Working Group has limited national data on mercury equipment in use in hospitals.

DEP has stack test data from Medical Waste Incinerators (MWI's), and other states and EPA have regional data. Data may be available at facilities about mass of waste burned, and some MWI's also have ash and water data, but MWI's don't account for whole hospital waste stream. DEP has limited data on Hg distribution in air, ash, and water releases from one particular incinerator.

DEP also has stack data from solid waste incinerators, but health care waste are not separated out. EPA and Vermont have limited data on air and water emissions from autoclaves.

MWRA has hospital mercury discharge data for its district, but it appears that no other Massachusetts POTW has accumulated this type of data. MWRA also has reports on Mercury Excretions from Amalgam Fillings, and mercury data from some POTW's outside of Massachusetts. Quebec and Nova Scotia have some dental discharge data, and Maine is now obtaining data on mercury in sewage from different sectors, including heath care.

3.5 Products Containing Mercury

- quarterly reports from Global Recycling for mercury collected with the state contract
- mercury reported collected from DEP manifests
- Maine study on generation rates
- AMSA study: "Evaluation of Domestic Sources of Mercury"
- NEMA reports with updates on alkaline batteries in New Jersey and Florida

- Food and Drug Administration report, Mercury Compounds in Drugs and Food (http://www.fda.gov/cder/fdama/mercuryreport.htm)
- CEC- report on model programs for source separation
- coming source: Thermostat Recycling Corporation- will soon begin operating in New England

3.6 Utilities

- NESCAUM, "Northeast States and Eastern Canadian Provinces Mercury Study"
- Natural Resource Defense Council, "Mercury Falling"
- EPA Study, ORD: Analysis of Emissions Reduction Options for the Electric Power Industry Report (3/99): 60% lower costs across the industry was found.
- Center for Clean Air Policy Study

Appendix B
HOUSE BILL 4803: AN ACT REGULATING PRODUCTS CONTAINING MERCURY

SECTION 1. Whereas, mercury poses a threat to human health and the environment in Massachusetts due to high levels of mercury in fish;

Whereas, the Department of Public Health has issued health advisories with respect to fish consumption from over eighty water bodies in Massachusetts due to high levels of mercury in fish;

Whereas, a major cause of mercury contamination in fish in Massachusetts is man-made mercury emissions from solid waste incinerators and medical waste incinerators; and

Whereas, the New England Governors and the Eastern Canadian Premiers recently adopted a Mercury Action Plan calling for a fifty percent reduction in mercury emissions by 2003 and calling for separation and recycling of waste products containing mercury as a means of achieving that goal;

It is hereby resolved that the policy goals of this Act shall be (1) to prohibit the disposal of mercury-containing waste products as solid waste and (2) to promote and ensure the proper collection, transportation and recycling of all mercury-containing waste products.

SECTION 2. Section 2 of chapter 21H of the General Laws, as appearing in the 1998 Official edition, is hereby amended by inserting after the definition of "Assessment" the following definition: --

"Battery", an enclosed device or sealed container consisting of a combination of one or more voltaic or galvanic cells, electrically connected to produce energy.

"Button cell", a button- or coin-shaped battery.

SECTION 3. Section 2 of chapter 21H of the General Laws, as so appearing, is hereby amended by inserting after the definition of "Closure" the following definition:--

"Department ", the department of environmental protection.

SECTION 4. Section 2 of chapter 21H of the General Laws, as so appearing, is hereby amended by inserting after the definition of "Drinking water supply" the following definition:-

"Electric lamp", the bulb or tube portion of a lighting device specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infra-red regions of the electromagnetic spectrum. Examples of common electric lamps include, but are not limited to, incandescent, fluorescent, high intensity discharge, and neon lamps.

SECTION 5. Section 2 of chapter 21H of the General Laws, as so appearing, is hereby amended by inserting after the definition of "Facility" the following definition:-

"Health care facility", any hospital, nursing home, extended care facility, long-term care facility, clinical or medical laboratory, state health or mental institution, institution for the mentally ill or retarded, clinic, physician's office, or health maintenance organization.

SECTION 6. Section 2 of chapter 21H of the General Laws, as so appearing, is hereby amended by inserting after the definition of "Landfill" the following definitions:--

"Manufacturer", a manufacturer of mercury-added products that may be sold or offered for sale in Massachusetts.

"Mercury-added battery", a button cell or mercuric oxide battery to which the manufacturer intentionally introduces mercury for the operation of the battery.

"Mercury-added lamp", an electric lamp to which the manufacturer intentionally introduces mercury for the operation of the lamp.

"Mercury-added product", a product to which the manufacturer intentionally introduces mercury, including, but not limited to, button cell or mercuric oxide batteries, electric lamps, thermostats, thermometers, automotive devices, electric switches, appliances, medical or scientific instruments, electric relays, or other electrical devices.

"Mercury-containing product", a product where mercury is an unintended ingredient of the product, including, but not limited to, acids, alkalis, bleaches, cleaning materials, and disinfectants.

SECTION 7. Section 2 of chapter 21H of the General Laws, as so appearing in the 1994 Official Edition, is hereby amended by inserting after the definition of "Solid waste" or "waste" the following definitions:--

"Solid waste collector", a person that accepts, collects or transfers solid waste for purposes other than recycling.

"Solid waste management facility", an established site or works, and other appurtenances thereto, which is, has been, or will be used for the handling, storage, transfer, processing, treatment or disposal of solid waste, including all land, structures or improvements which are directly related to solid waste activities.

SECTION 8. Chapter 21H of the General Laws is hereby amended by inserting after section 6 the following new sections:--

Section 6A. (a) Every manufacturer of mercury-added products that may be sold or offered for sale or promotional purposes in the commonwealth shall ensure that the proper collection, transportation and recycling of mercury-added products occurs in the commonwealth by:

(1) establishing and funding, directly or with the use of third parties, a collection system through which the used mercury-added products sold or offered for sale by that manufacturer can be returned for recycling; or

(2) identifying existing collection systems through which the used mercury-added products sold or offered for sale by that manufacturer can be returned for recycling.

(b) Every manufacturer of mercury-added products shall be financially responsible for the collection and recycling systems established under section six A(a)(1). All collection and recycling shall be conducted in a manner so as to prevent the release of mercury to the environment and must be in full compliance with all applicable local, state and federal regulations. All collection and recycling systems shall be subject to department approval. As part of the approval process, the department shall ensure that all Massachusetts residents have access to mercury collection and recycling systems that are convenient, comprehensive, and cost-effective.

(c) Every manufacturer of mercury-added products shall ensure that such products are labeled in a manner to clearly inform purchasers that (1) mercury is present in the item and that the item may not be disposed of or placed in a waste stream destined for disposal until the mercury is reused, recycled, or properly disposed of as a hazardous waste and does not become part of solid waste or wastewater; and (2) every manufacturer shall also inform purchasers how to access systems for the collection, transportation and recycling of mercury-added products.

Section 6B. No person shall sell, offer for sale, or offer for promotional purposes in the commonwealth a mercury-added product, unless the product bears the labels required by section six A (c) . The labeling requirement in section six A (c) shall not apply to any mercury-added product for which federal law governs labeling in a manner that pre-empts state authority.

Section 6C. No person shall dispose of mercury-added products in any manner other than by their recycling or disposal as hazardous waste and no person shall knowingly incinerate used mercury-added products in the commonwealth.

Section 6D. (a) No solid waste collector shall knowingly collect solid waste that contains one or more mercury-added products, unless such solid waste is collected at a permitted household hazardous waste collection facility for the purpose of recycling said waste.

(b) A solid waste collector shall refuse to collect the contents of a solid waste container containing one or more mercury-added products, unless such solid waste is collected at a permitted household hazardous waste collection facility for the purpose of recycling said waste.

Section 6E. (a) No owner or operator of a solid waste management facility shall knowingly accept for disposal solid waste that contains one or more mercury-added products, unless such waste is collected at a permitted household hazardous waste collection facility for the purpose of recycling solid waste. All owners and operators of solid waste management facilities must have appropriate notification and inspection

procedures in place designed to prohibit mercury added products from being disposed of at such facility. At a minimum, said owner or operator shall implement the following mechanisms:

(i) Posting of signs at the facility providing notice of the prohibition of the disposal and incineration of mercury-added products;

(ii) Written notification to or contractual agreements with the facility's customers, providing notice of the prohibition of the disposal and incineration of mercury-added products;

(iii) Implementation of a procedure approved by the department for periodically monitoring incoming wastes to detect the presence of mercury-added products at the facility.

(b) An owner or operator of a solid waste management facility shall refuse to accept for disposal the contents of a solid waste container containing one or more mercury-added products, unless such waste is collected at a permitted household hazardous waste collection facility for the purpose of recycling solid waste.

Section 6F. (a) The department shall establish a means of addressing consumer inquiries and complaints and a public education program to assure the widespread dissemination of information concerning the purpose of sections six A through six E and section 6G of this chapter. Such public education program shall include, but not be limited to, information regarding source reduction and recycling programs for mercury added products through one or more published reports and one or more forms of electronic media.

(b) The department shall adopt rules, regulations, procedures and standards as may be necessary for the implementation of sections six A through six E and section 6G of this chapter.

(c) The department shall promulgate regulations under this Act which are consistent with the federal Mercury-Containing and Rechargeable Battery Management Act at sections 14302 through 14336 of chapter 42 of the United States Code.

(d) The department shall, every two years, make available to the public information concerning the amount of mercury diverted from the solid waste stream that would otherwise be sent to solid waste management facilities for disposal or incineration.

Section 6G. Every manufacturer of mercury-containing products used in health care facilities, as defined in section two of this chapter, shall provide each such facility and the Secretary of Environmental Affairs with a certificate of analysis documenting the mercury content of any such product containing more than one part per billion of mercury. The certificate of analysis shall report the result of an analysis performed for mercury on a specific lot or batch of the mercury-containing product. The batch or lot number of the product shall be clearly identified on the product and on the certificate of analysis. The Secretary of Environmental Affairs may review the data contained in the certificate of analysis, in consultation with the manufacturer, and take appropriate action to require the manufacturer to eliminate or reduce the mercury content of the product.

SECTION 9. Section 8 of chapter 21H of the General Laws, as so appearing, is hereby amended by inserting after the first appearance of the word "violation", in line 7, the following:-- "; except that any household that violates section six C of this chapter, or any rule, regulation, or order, issued or adopted under that provision shall not be subject to a civil penalty."

SECTION 10. Once the provisions of this act become law, the materials separation plan provisions of 310 CMR 7.08 shall no longer pertain to any person subject to 310 CMR 7.08.

SECTION 11. This act shall take effect on November first, two thousand.

Appendix C
SUMMARY OF THE MWRA/MASCO MERCURY MANAGEMENT HANDBOOK

The Mercury Management Guidebook is a product of the Phase II MWRA/MASCO Mercury Work Group, Mercury Management Subcommittee, Mercury Management Plan Subgroup. It can be used as a reference by industrial facility owners in the development of a Mercury Management Plan to solve sewer discharge compliance problems. The plan of action may involve initiation of a source reduction program or enhancement of an existing one, and it may also involve implementation of an industrial wastewater pretreatment strategy.

The Guidebook is intended to help owners of industrial facilities to understand the process of identifying, reducing, and eliminating sources of mercury; provide information on methods for monitoring and treating mercury discharges; and present industry-specific case studies on mercury sources and successful control programs. Several subject areas and processes are highlighted that may help MWRA-permitted sewer dischargers to find solutions to mercury compliance problems.

The reports from Phase II of the Work Group effort provide new and updated information that generally supersede earlier reports. The Phase II reports are as follows:

- *Facilities Loadings Subgroup Report*- estimated sewer discharge loadings of mercury from five types of facilities discharging to the MWRA sewerage system.

- *Pretreatment Guidance Manual*- recommended steps for implementing coordinated source reduction, source segregation, and pretreatment including mercury pretreatment.

- *Technology Identification Subgroup Report*- background and results of a bench-scale feasibility testing project involving six different mercury pretreatment technologies.

- *Mercury Management Guidebook*- recommended steps for overall management of mercury to reduce and control the mercury concentration of sewer discharges.

Many dischargers have found that actions in each of these areas are needed as part of an ongoing Mercury Management Plan. Control measures span the spectrum of administrative, procedural, and engineered controls. Source reduction, source segregation, infrastructure improvements and, in some cases, pretreatment will be needed. Frequently, more than one measure may be needed to achieve continuously the MWRA mercury discharge enforcement limit of 1.0 µg/L (ppb). While the sequence of actions carried out by different institutions may vary, it has proven helpful to go through the steps listed below when developing a plan for controlling mercury discharges:

- Inventory past and present mercury sources (uses) in the facility.

- Verify and, if possible, quantify suspected mercury sources by reviewing available data and contacting product and chemical manufacturers.

- Track pathways by which mercury enters wastewater and the sewer system.

- Conduct a targeted monitoring program to track the location of mercury sources in the facility and any changes in mercury discharges at permitted monitoring locations that result from source reduction, infrastructure improvements, or pretreatment.

- Identify substitute products and alternative processes to reduce or eliminate current mercury uses through information exchange and contact with manufacturers.

- Evaluate and test possible substitute chemicals, operating procedures, and production processes for effectiveness, and implement those that are feasible.

- For products or chemicals without available substitutes, segregate the associated waste streams for special handling and disposal.

- Establish and publicize a facility policy on the sewer disposal of individual wastewater streams.

- Develop and implement an employee training and education program.

- Conduct wastewater characterization studies to obtain specific data regarding problem sources or chemicals, monitor progress in reducing mercury concentrations, and learn of possible interference with candidate mercury pretreatment systems from, for example, suspended solids, other heavy metals, or complexing agents. Reduce or segregate such interfering waste streams.

- If necessary, clean or replace waste piping infrastructure (traps, drains, and lines) in the facility to remove mercury accumulations from past use and mercury-contaminated bacteriological growth (biomass).

- Implement mercury pretreatment of wastewater, if needed, to achieve compliance.

- Reconsider and implement additional source reduction actions, infrastructure improvements, waste segregation, or pretreatment processes to reduce mercury levels further as needed to remain in compliance, using routine monitoring of operations and of wastewater discharges as guides for action.

For a flow diagram depicting much of this process, refer to Section 3.0, Step-by-Step Approach to Discharge Compliance, of the MWRA/MASCO Mercury Work Group, Phase II, End-of-Pipe Subcommittee, *Pretreatment Guidance Manual*, December 1997.

Appendix D
KEY RESOURCES AND CONTACTS

Massachusetts Fish Consumption Advisories

DPH, "Freshwater Fish Consumption Advisory List"
http://www.magnet.state.ma.us/dph/beha/fishlist.htm

Studies and Reports

DEP, "Mercury in Massachusetts," 1996
http://www.state.ma.us/dep/files/mercury/hgtoc.htm

DEP, "Fish Mercury Distribution in Massachusetts Lakes," 1997
http://www.state.ma.us/dep/files/mercury.htm

MWRA, "Mercury in Dental Facilities" (Webpage contains executive summary and ordering information.)
http://www.mwra.state.ma.us/sewer/html/dentsum.htm

MWRA/MASCO reports
http://www.masco.org

Regional Efforts

NEGC, Regional Mercury Action Plan
http://www.tiac.net/users/egc/1998mercuryplan.html.

NEWMOA, information on draft model mercury products legislation
http://www.newmoa.org/Newmoa/htdocs/prevention/mercury/

Education and Outreach Material

DEP, HHP Frequently Asked Questions
http://www.state.ma.us/dep/recycle/hazards/hhwhome.htm

DPH, "Public Health Fact Sheet: Mercury"
http://www.magnet.state.ma.us/dph/beha/mercury.htm

MWRA, Household Hazardous Waste Booklet (Webpage contains ordering information.)
http://www.mwra.state.ma.us/sewer/html/tracpub.htm

MWRA, "Dentistry and the Environment" (Webpage contains brochure in PDF format.)
http://www.mwra.state.ma.us/sewer/html/tracpub.htm

UMass Lowell Sustainable Hospitals Project
http://www.uml.edu/centers/LCSP/hospitals/index.html

National Efforts and Other Regions

AHA-EPA MOU
http://www.epa.gov/toxteam/ahamou.htm

Bi-National Toxics Strategy
http://www.epa.gov/grtlakes/p2/bns.html

EPA PBT Program
http://www.epa.gov/pbt/hgaction.htm

EPA Partners for Change Program
http://www.epa.gov/region01/steward/partners/index.html
http://www.nhha.org/Library/mercury.htm