Regional TMDL Atmospheric Deposition Goal

To meet the initial TMDL target of 0.3 ppm, the mercury TMDL for the region is 1,750 kg/yr, or 4.8 kg/d. This is divided into a wasteload allocation of 38 kg/yr and a load allocation of 1,712 kg/yr. The load allocation for natural sources is 1,626 kg/yr, leaving an anthropogenic load allocation of 86 kg/yr. Implementation of this goal is divided into three phases. Phase I, from 1998 to 2003, sets a goal of 50 percent reduction, from in-region and out-of-region sources, from the 1998 baseline. With in-region reductions of 1,549 kg/yr achieved as of 2002, the in-region reduction goal has been exceeded. Phase II, from 2003 to 2010, sets a goal of 75 percent reduction. This leaves 20 kg/yr for in-region reductions necessary to meet this target. In 2010, mercury emissions, deposition, and fish tissue concentration data will be re-evaluated in order to assess progress and set a timeline and goal for Phase III to make remaining necessary reductions to meet water quality standards. Not enough data are currently available to accurately assess reductions achieved by out-of-region sources.

Adaptive Implementation

The TMDL is structured to separately show loading goals for in- and out-of-region sources and is expected to be implemented adaptively in order to evaluate the calculated necessary percent reduction from anthropogenic sources. The Northeast states have already reduced deposition by approximately 74 percent between 1998 and 2002 and have reasonable assurances (including product legislation and emissions controls) in place to assure attainment of Phase II goals on an adaptive basis. To meet out-of-region goals, Northeast states recommend EPA implement plant-specific MACT limits for mercury under Section 112(d) of the Clean Air Act to control power plant emissions by 90 percent by cost-effective and available technologies. The Northeast region's ability to achieve the calculated TMDL allocations is dependent on the adoption and effective implementation of national and international programs to achieve necessary reductions in mercury emissions. Given the magnitude of the reductions required to implement the TMDL, the Northeast cannot reduce in-region sources further to compensate for insufficient reductions from out-of-region sources.

TFMC	TMDL Daily Load 80th Percentile	TMDL Daily Load 90th Percentile
0.3	TMDL (6.4 kg/d) = [WLA (51 kg/yr) + LA (2,269 kg/yr)]/365	TMDL (4.8 kg/d) = [WLA (38 kg/yr) + LA (1,712 kg/yr)]/365
0.2	TMDL (4.2 kg/d) = [WLA (51 kg/yr) + LA (2,269 kg/yr)]/365	TMDL (3.2 kg/d) = [WLA (38 kg/yr) + LA (1,712 kg/yr)]/365
0.1	TMDL (2.1 kg/d) = [WLA (17 kg/yr) + LA (756 kg/yr)]/365	TMDL (1.6 kg/d) = [WLA (13 kg/yr) + LA (571 kg/yr)]/365

The WLA is defined for this mercury TMDL as 2.1 percent of the TMDL to ensure that water point source mercury loads remain small and continue to decrease.

9 Implementation

This regional TMDL will be implemented using adaptive implementation in order to ensure calculated reduction targets are appropriate as measured mercury fish tissue concentrations decline. It is expected that states will continue fish tissue monitoring at the same level that has been conducted in recent years, provided that sufficient funding is available. If monitoring shows that fish tissue concentrations have declined to levels that meet water quality standards before the calculated percent reduction in anthropogenic loadings is achieved, targets will be adjusted based on that monitoring.

Implementation has been divided into three phases. The timeline and goals for the first two phases align with the NEG-ECP Regional MAP. Phase I is from 1998 to 2003 with a goal of 50 percent reduction and Phase II is from 2003 to 2010 with a goal of 75 percent reduction. The goal of Phase III will be to make any further necessary reductions to meet the target fish mercury concentrations. However, the exact timeline and reduction goal for this phase cannot be determined until mercury emissions, deposition, and fish tissue concentrations are re-evaluated in 2010. The goal for Phase III may or may not match the percent reduction that current calculations show. To meet the necessary reductions required in Phase III, major air point sources will be addressed through the application of more stringent control technology requirements and/or emission limits, economically and technically feasible/achievable, taking into account advances in the state of air pollution controls and the application of transferable technologies used by other sources to achieve maximum emission reductions. Emissions from area sources will be controlled to the maximum extent feasible using best management practices and pollution prevention approaches.

9.1 State and Regional Implementation

9.1.1 Implementation of Wasteload Allocation

In 2005, it was estimated that approximately 72 percent of dentists in New England had installed amalgam separators. As the point source load for this TMDL was based on data from 1988 to 2005, the regional point source load has most likely already significantly decreased as a result of amalgam separator installation. As of 2006, all of the Northeast states have legislation or regulations that require installation of amalgam separators, which will further reduce mercury loads in wastewater. As of 2006, all of the Northeast states have comprehensive mercury products legislation. This will result in additional reductions in mercury concentrations in wastewater by reducing mercury input from household uses. As was discussed in Section 7.5, this TMDL places much emphasis on the fact that the states have agreed to a goal of virtual elimination of mercury. Individual laws and requirements vary by state, but legislation addresses bans on disposal of mercury-added products, bans on sale or distribution of mercury-added

Table 9-1 Northeast State Mercury Control Programs for Coal-Fired Utilities

State	Rule
CT	On or after July 1, 2008, coal-fired utilities are required to meet an emissions rate equal to or less than 0.6 lbs of mercury per trillion British thermal units (TBtu) or meet a rate equal to 90 percent reduction, whichever is more readily achievable. On or before January 1, 2012, CT DEP will conduct a review of mercury emission limits applicable to affected units and may adopt regulations to impose more stringent limits.
ME	Currently all coal-fired utilities and other facilities in Maine have a mercury emissions limit of 50 lbs/yr. Recently enacted legislation changes the limit to 35 lbs/yr in 2007 and 25 lbs/yr in 2010. A mercury reduction plan would also be required for any facility emitting more than 10 lbs/yr.
MA	Phase I, which takes effect January 1, 2008, requires that each facility capture at least 85 percent of mercury in the coal burned, or emit no more than 0.0075 lbs of mercury per net gigawatt-hour of electricity generated. Phase II, which takes effect October 1, 2012, requires that facilities capture at least 95 percent of the mercury in coal burned, or emit no more than 0.0025 lbs of mercury per net gigawatt-hour of electricity generated.
NH	An Act Relative to the Reduction of Mercury Emissions provides for 80 percent reduction of mercury emissions from coal-burning power plants by requiring installation of scrubber technology no later than July 1, 2013 and provides economic incentives for earlier installation and greater reductions in emissions.
NY	Phase I requires a 50 percent decrease by January 1, 2010 and Phase II will implement a unit-based limit for each power plant facility. This will result in an estimated 90 percent decrease from current levels, which will result in total emissions of 150 lbs/yr or less.

In addition to enforceable controls on coal-fired utilities, the next phase of the NEG-ECP MAP focuses on working toward reductions from four other sectors: sewage sludge incinerators (SSIs), MWCs, area sources, and residential heating/commercial and industrial oil combustion. SSIs will be addressed by the now mandatory installation of amalgam separators in all Northeast states and reducing use of mercury-added products by consumers and the health care sector. Reductions will be achieved from MWCs by pollution prevention efforts, mercury-added product legislation, and possibly enhanced pollution controls. Emissions from area sources are likely to decrease as a result of pollution prevention initiatives. Limited data on the residential heating/commercial and industrial oil combustion sectors make it difficult to set emissions targets for this sector, but emissions can be reduced through modifications to fuels combusted, shifting to lower mercury oils, energy conservation efforts, and increased use of renewable energy sources.

Through the NEG-ECP MTF process, New England states have made a commitment toward the virtual elimination of mercury. As mentioned previously, while New York State is not a member of the NEG-ECP, they too have made a state-wide commitment to reduce mercury. These goals and commitments are complimentary to this TMDL. Between 1998 and 2002, regional mercury deposition was reduced by approximately 74 percent. Since 2002, a number of mercury reduction programs have been implemented and many regulations have passed, to further reduce regional mercury deposition. However, as updated deposition modeling has not been undertaken, these reductions are not yet quantifiable. The regional emissions inventory and deposition modeling will be updated in 2010. With the implementation of reduction programs and legislation since 2002, and full implementation of legislation that has been passed, the Northeast states are addressing all mercury sources within their control. More information on state mercury reduction efforts is provided in Appendix D.

landfills and incinerators, and requires retailers to provide for take back of these batteries from customers. An Act to Limit Human Exposure to Mercury has a goal to transition to mercury-free dentistry. An Act to Require that Hazardous Waste be Removed from Junked Vehicles includes a requirement for removal of mercury switches.

As described in Section 9.1, currently all facilities in Maine have a mercury emissions limit of 50 lbs/yr. Recently enacted legislation makes the limit more strict and requires a mercury reduction plan for any facility emitting more than 10 lbs/yr. In addition, all facilities with a wastewater discharge are subject to the requirements of *Interim Effluent Limitations and Controls for the Discharge of Mercury, 06-096 CMR 519* (effective February 5, 2000) which require effluent limits be established and that all facilities develop and implement a mercury pollution prevention plan. All facilities in the state are in compliance with this rule.

Massachusetts

The Mercury Management Act, passed in 2006, requires end-of-life recycling of mercury-containing products, prohibits disposal of mercury in trash and wastewater, bans the sale of specific products containing mercury, directs schools and state government to stop purchasing mercury-containing items, establishes a program for removing switches from vehicles, and requires manufacturers both to notify the state of products with mercury content, and to establish end-of-life collection and recycling programs. In April 2006, regulations took effect that require most dental practices and facilities in Massachusetts to install and operate amalgam separator systems, recycle mercury-containing amalgam wastes, and periodically certify their compliance with the requirements. Prior to the regulations, MassDEP implemented a voluntary program with the Massachusetts Dental Society to encourage early installation and use of amalgam separators by dentists.

The Municipal Waste Combustor Rule required facilities with a capacity greater than 250 tons/day to meet an emissions standard of 28 µg/dcsm by December 2000 and to develop material separation plans for products containing mercury. Massachusetts also has strict controls on mercury emissions from coal-fired power plants. These regulations are described in more detail in Section 9.1

MassDEP recently conducted a study to examine changes in fish tissue mercury concentrations in an area of Northeastern Massachusetts with elevated mercury deposition due to local emissions sources. Over the study period, local mercury emissions decreased by 87 percent, and as a result, fish tissue mercury concentrations decreased an average of 25 to 32 percent (Hutcheson, et al. 2006). Consistent decreases were seen 48 months after emissions controls were put in place. This response time was much shorter than was expected. The results of this study emphasize the point that decreases in mercury emissions can result in timely decreases in fish mercury concentrations.

New Hampshire

New Hampshire legislation puts restrictions on the mercury content of batteries and establishes notification requirements for manufacturers of mercury-added products. New Hampshire has a ban on the sale of toys, games, cards, ornaments, or novelties that contain mercury and mercury fever thermometers. No school can use or purchase elemental mercury, mercury compounds, or mercury-added instructional equipment and materials in a primary or secondary classroom. Legislation required all dental practices to install amalgam separators by October 2005.

Any MWC with a design capacity to burn 100 tons/day or more must reduce emissions to achieve no more than 0.028 mg/dscm or at least 85 percent control efficiency. All MWIs must achieve an emissions

limit of 0.055 mg/dscm. As described in Section 9.1, New Hampshire recently passed legislation to limit mercury emissions from coal-fired power plants.

New York

A law adopted in September 2005 prohibits the sale and distribution of some mercury-added products including thermostats, barometers, esophageal dilators, bougie tubes, gastrointestinal tubes, flow meters, hydrometers, hygrometers, psychrometers, manometers, pyrometers, sphygmomanometers, thermometers, and switches and relays. The law also requires manufacturers and trade associations dealing in mercury-added products to report certain information to NYS DEC. Regulations effective in May 2006 prohibit the use of non-encapsulated elemental mercury in dental offices and require dentists to recycle any elemental mercury or dental amalgam waste generated in their offices. Dental facilities are required to install, properly operate, and maintain mercury amalgam separation and collection equipment. Although not mandated by law, New York State is working on pollution prevention efforts for health care facilities, an automobile switch collection and recycling project, and a dairy manometers identification and removal program.

New York State has an emission limit for large MWCs (greater than 250 tons/day) of 28 µg/dscm or 85 percent removal, whichever is less stringent. Regulations were recently passed for coal-fired utilities, the details of which are provided in Section 9.1

Rhode Island

The Mercury Reduction and Education Act requires the phase-out of mercury-added products, labeling, collection plans, bans on certain products, and elimination of mercury from schools. No mercury fever thermometers can be sold after January 1, 2002. After January 1, 2003, no mercury-added novelty can be sold in Rhode Island, unless its only mercury component is one or more mercury-added button cell battery. No school can use or purchase for use bulk elemental or chemical mercury or mercury compounds for use in primary or secondary classrooms. After January 1, 2006 mercury-added products can only be disposed of through recycling or disposal as hazardous waste. Legislation now requires removal and collection of mercury switches from automobiles. RI DEM currently has a voluntary self certification program for installation of amalgam separators, and legislation that passed in 2006 requires dental offices to install amalgam separators by July 2008.

Rhode Island has a mercury emissions limit of 0.055 mg/dscm for all MWIs.

Vermont

Vermont passed the nation's first mercury labeling law in 1997 and then passed Comprehensive Management of Exposure to Mercury in 2005, with amendments in 2006. This law establishes a comprehensive approach to reducing the exposure of citizens to mercury released in the environment through mercury-added product use and disposal, including requirements that manufacturers of mercury-added products provide notice to the agency and report on total mercury contained in certain products, a ban on the distribution or offering for sale of mercury-added novelties, fever thermometers, thermostats, and dairy manometers, and other devices, and to modify the existing labeling requirements for mercury-added products and packaging by expanding the types of products subject to labeling. It also bans the disposal of mercury-added products such as thermostats, thermometers, automobile switches, and bulbs in landfills and incinerators, requires source separation of discarded mercury-added products, and requires solid waste management facilities to inform customers of disposal bans and collection programs for mercury-added products. The law also prohibits purchase and use of mercury-added products and elemental mercury in primary and secondary schools. Dental practices are required to follow mercury