

## **Basis for Mercury Education and Reduction Model Legislation**

The Conference of New England Governors and Eastern Canadian Premiers has concluded that aggressive and concerted actions are needed to reduce potential health risks attributable to mercury exposures and to expand scientific information on mercury sources, controls and environmental impacts.

This conclusion is based on extensive scientific data that indicate that mercury is pervasive in freshwater fish in the Northeast at levels that pose plausible health risks to people and some species of fish eating wildlife. In addition to the potential health effects caused by this contamination, there are important economic consequences, including reducing the recreational and commercial value of fisheries resources across the region.

### Sources of Mercury

There are many sources of mercury in the environment. Although natural sources of mercury exist, recent research suggests that background concentrations of this metal in the atmosphere and sediments have increased by a factor of two to five since pre-industrial times. This suggests that anthropogenic sources have significantly increased mercury levels in the environment.

The mercury in the air originates from many sources both within and outside of the region. Analyses suggest that a wide array of sources of mercury emissions contribute to overall deposition in the region. Municipal waste combustors are currently considered to be the largest emission source sector in the Northeast; utility and industrial boilers are the largest source sector in the remainder of the U.S., primarily from the combustion of coal; and non-ferrous metal production, (i.e. nickel, aluminum), is the major source of airborne mercury emissions in Eastern Canada. Computer modeling conducted for the report, *Northeast States and Eastern Canadian Provinces Mercury Study, A Framework for Action* indicates that 30 percent or more of the mercury deposited in the Northeast originates from sources outside of the region, primarily coal fired power plants.

Much of the mercury entering the waters of the region settles from the air or is deposited in rain or other precipitation. Atmospheric mercury mixes with rain and snow and falls into lakes, rivers, and watersheds. Once mercury enters the waterway, natural processes convert a small portion of it to methyl-mercury. About two-thirds of mercury in the atmosphere comes from human sources, such as coal burning power plants and incinerators, and one-third from natural sources, such as volcanoes and forest fires. The amount of mercury flowing into the water bodies in New England is between two and four times what flowed into them 100 years ago.

### Presence in Waterbodies

In the ambient air, mercury levels are not dangerous; it is the cumulative amount of mercury deposited to waterbodies and its subsequent chemical transformation to methyl-mercury (a very toxic form of mercury), that creates problems. Fish absorb and retain methyl-mercury, causing it to bioaccumulate up the food chain until it is concentrated up to millions of times above the level in the surrounding water, particularly in older, predatory fish.

Numerous studies document elevated levels of methyl-mercury in freshwater fish across the Northeast United States and Eastern Canada. Mercury levels in freshwater fish have been monitored in the Northeastern U.S. since the 1970s. The results of these monitoring programs indicate that levels of mercury significantly exceed acceptable values in fish species from certain waterbodies in the region. This information has led public health officials in the northeast U.S. to issue advisories recommending that people limit their consumption of potentially contaminated fish.

#### Exposures and Health Effects

When methyl-mercury-tainted fish are consumed by pregnant women, women of childbearing age, and children they can be at a high risk. Methyl mercury can impair development of the nervous system in fetuses and in young children, affecting sensory, motor, and cognitive functions, resulting in such problems as difficulty in learning to read and inability to concentrate. Wildlife in the region may also be adversely affected, as high levels of methyl-mercury have been measured in fish-eating birds, such as loons and eagles.

While ingestion of contaminated fish is the primary pathway of human exposure to methyl-mercury, people can be exposed to other dangerous forms of mercury at work, in school science laboratories and in their homes. Such exposures can occur following the breakage and improper cleanup of mercury containing products or as a result of children finding, spilling and playing with improperly stored or maintained elemental mercury. In addition to the tragic health effects that can be caused by such exposures, the costs of cleaning up the resulting mercury contamination can be considerable. Reduced use of mercury and better education of workers and the public about the dangers of mercury and proper handling procedures for it would help reduce the number of incidences as well as the health, environmental and economic costs of these exposures.

#### Regional Coordination

Rates of mercury air deposition are estimated to be higher in the Northeastern U.S. relative to most other parts of the country. This situation is in part due to the existence of significant sources of mercury within the region. There is also strong evidence showing that, similar to other pollutants, airborne mercury emitted by upwind sources is transported by prevailing winds into the region. Two other factors also thought to exacerbate the mercury problem in the region include (1) the acidified condition of many waters of the region, brought on by excess acid deposition, is associated with higher levels of methyl-mercury in fish in impacted lakes; and (2) elevated summertime levels of tropospheric ozone exacerbate the conversion of elemental mercury in the atmosphere to chemical forms that are more susceptible to deposition.

Because of the transboundary nature of mercury pollution, no single state or province will be able to solve its mercury problem alone. Concerted and coordinated regional efforts are needed. Ultimately, national and international efforts will be required to address transboundary mercury emissions, particularly from the utility sector. However, because the majority of the deposited mercury is from

sources in the region, much can be done locally to address this problem. The aggressive commitments embodied in the New England Governors/Eastern Canadian Premiers Regional Mercury Action Plan are designed to provide leadership to encourage similar actions to reduce mercury emissions nationally and internationally.

### **Governors'/Premiers' Mercury Action Plan**

The Conference of the New England Governors and Eastern Canadian Premiers are implementing the recommendations of the Mercury Action Plan that they adopted in 1998. The Action Plan identifies steps to address those aspects of the mercury problem in the Northeast that are within the Region's control or influence. The Action Plan's ultimate goal is the "virtual elimination of the discharge of anthropogenic mercury into the environment, which is required to ensure that serious or irreversible damage attributable to these sources is not inflicted upon human health and the environment."

By addressing the sources of mercury within the region, the states and provinces can take action to reduce mercury contamination to levels that are safe for people and wildlife, and provide an example for other regions. To achieve the virtual elimination goal, it is essential that efforts to reduce mercury use, emissions, and discharges be initiated now. The steps outlined in the Action Plan focus on achieving such reductions over time through a combination of source reduction, safe waste management practices, and aggressive emissions controls. Another important goal of the Plan is the collection of additional scientific information on mercury emissions, cycling and environmental impacts, to allow for documentation and evaluation of the effectiveness of regional actions on mercury.

The New England Governors and Eastern Canadian Premiers recognize the following principles as the guidelines for action on mercury in the region:

- In order to protect human health and the environment, the precautionary principle shall be used. Where there are threats of serious and irreversible damage, lack of full scientific certainty shall not be a rationale for postponing measures to prevent environmental degradation and to protect public health.
- Efforts to eliminate mercury contamination in one environmental media should not result in significant contamination of another media.
- Coordination of the efforts of the New England states and Eastern Canadian provinces is necessary for effective response strategies to address mercury issues.
- Environmental goals and objectives, in keeping with sustainable development, shall be formulated and implemented in ways that achieve high levels of ecological and human health benefit.

- While mercury is a regional problem that requires regional solutions, out-of-region sources are also a major contributor to this environmental threat; the New England states and Eastern Canadian provinces stress the need for appropriate controls on sources outside the region. However, the need to coordinate efforts and work with other regions should not be viewed as a reason to delay action within the region.

To coordinate the efforts of the New England states and the Eastern Canadian Provinces the Secretariats of the Conference of New England Governors and Eastern Canadian Premiers established a regional Mercury Task Force in September 1998.

In keeping with the principles outlined, the following objectives and recommendations are being pursued by the states and provinces and coordinated by the Mercury Task Force.

### **Mercury Emissions Reductions**

Overall Regional Objective: By the year 2003, reduce mercury emissions through the implementation of the actions herein which, if completed, are expected to achieve a reduction of at least 50 percent, through emissions reductions as well as source reductions and safe waste management.

#### Source Specific Emission Reduction Goals

Municipal Solid Waste Combustors:

Objective: By 2003, reduce the overall amount of mercury emitted from municipal solid waste (MSW) combustion sources in the region through a combination of source reduction, waste segregation and emissions controls.

Medical Waste Incinerators:

Objective: By 2003, reduce - to the maximum extent feasible - the overall amount of mercury emitted from medical waste incinerators in the region through a combination of source reduction, waste segregation and emissions controls.

Area Sources:

Objective: Maximum achievable reductions in mercury emissions will be achieved for each subcategory - general lab use, dental preparation and use, paint use, crematories, and landfills - as noted in the Northeast States and Eastern Canadian Provinces Mercury Study within the shortest possible timeframe.

### **Source Reduction and Safe Waste Management, including Recycling**

Overall Regional Objective: Eliminate or reduce non-essential uses of mercury in household, institutional and industrial products and processes. Segregate and recycle mercury attributable to the remaining uses

and or products to the maximum degree possible.

Objective: By 2003, reduce the overall amount of mercury-containing wastes from household, commercial and industrial sources, through source reduction, segregation and safe waste management, including recycling.

Selected Recommendations:

- Reduce/eliminate the use of mercury in medical and consumer products to the extent feasible.
- Identify and implement source reduction programs and develop model legislation.
- Draft model legislation implementing coordinated labeling and manufacture take-back programs to help consumers identify products containing mercury and how to properly dispose of them, and work with the New England congressional delegation and members the Canadian Parliament from Eastern Canada to enact labeling legislation.

In those instances where source reduction is not currently feasible, promote the safe management and recycling of mercury-containing wastes.

Selected Recommendations:

- Develop strategies to minimize cross-media impacts of mercury management policies by coordinating efforts and facilitating discussions among air, water, and waste programs.
- Support regional collaboration to resolve regulatory issues and barriers associated with safe waste management and recycling of mercury containing wastes and to enhance state and provincial implementation of improved regulatory programs.

## **Outreach and Education**

Educate the public about the adverse health and environmental effects of mercury and ways to reduce the risk of exposure. Develop effective outreach programs for at-risk populations.

Educate the public and industry about products that contain mercury and recommend appropriate substitutes and other methods of reducing their use of mercury and proper recycling and waste management techniques.

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