

3.0 REGULATORY ACTIONS AND OTHER FACTORS THAT INFLUENCE MERCURY RESEARCH PRIORITIES

3.1 NATIONAL ACADEMY OF SCIENCES REPORT

In the FY 1999 conference report for EPA's appropriation (U.S. House of Representatives, 1998), Congress directed the Agency to "... enter into a contract ... with the National Academy of Sciences (NAS) to perform a comprehensive review of mercury health research" As part of that study, NAS was to make recommendations on a scientifically appropriate reference dose (RfD) for mercury exposure. Methylmercury was specifically targeted and the goal was to resolve varying interpretations of methylmercury health effects data. EPA was directed to delay any decisions to regulate mercury until the NAS findings had been published. The findings of the NAS study (NRC, 2000) were presented on July 11, 2000. They support EPA's current RfD of 0.1 micrograms per kilogram body weight per day as a scientifically justified level to protect human health. The study further affirmed that the fetus is the most vulnerable to methylmercury effects and that the developing nervous system is the critical endpoint for risk calculations.

The NAS report evaluated data on methylmercury effects from the Seychelles and Faroe Islands studies, as well as recently published data from a New Zealand study. An integrative analysis of all three studies was performed and some of the Faroe Islands study data were extensively re-analyzed. Using these analyses, NAS recommended that the data from the Faroe Islands study (rather than the data from an older Iraqi study) be used as the basis for the RfD (NRC, 2000). The Iraqi study, involving poisoning through the consumption of mercury-treated wheat, was used to establish the EPA RfD in 1994 (EPA, 1997a). The NAS study also recommended that a safety factor of 10 was needed to address any scientific uncertainties that remained. With the NAS study completed and supportive of the Agency's RfD, EPA is now faced with making decisions on regulating mercury and methylmercury in the environment.

3.2 REGULATORY AND OTHER DOMESTIC COMMITMENTS

Numerous Program Office commitments related to mercury must be addressed over the next five to ten years (Table 2). This section presents a brief summary of existing and proposed regulations and initiatives related to mercury. The data collected in preparation for rule making or submitted in compliance with regulatory requirements or initiatives will help guide the *Mercury Research Strategy*. Likewise, the information collected as part of the *MRS*

research effort will help inform the rule making process. This exchange of mercury-related information will improve the Agency's understanding of mercury use in specific industries, its impact on human health and wildlife, and its fate and transport. Descriptions of existing and proposed mercury-related regulations and initiatives are summarized in Table 2 and described in this section.

3.2.1 Regulatory Activities

Mercury Controls for Utilities: One of the most important commitments is the Office of Air and Radiation's (OAR's) implementation of the 1990 Clean Air Act, as amended. As required by section 112(n) of the Act, EPA is faced with regulating hazardous air pollutants (HAPs), including mercury, from coal-fired electric utility steam generating units. A positive determination means that EPA is required to propose regulations by December 15, 2003 and promulgate final regulations by December 15, 2004. Full compliance by the utility industry would be expected by December 15, 2007. Such a regulatory program requires the development of technical information and data on the cost and performance of options (*e.g.*, flue gas treatment, coal cleaning) to reduce utility boiler emissions.

MACT Rules for Chlorine Production and Municipal Solid Waste Landfills: Under section 112 of the Clean Air Act, EPA is required to develop national emission standards based on maximum achievable control technologies (MACT) for HAPs (which includes mercury) listed in section 112 (b) for various source categories such as chlorine production, municipal landfills, and industrial/commercial/institutional boilers. Generally, sources are required to be in full compliance with these rules three years after promulgation of the final rule.

Chlorine Production - OAR is developing a rule that will limit mercury emissions from plants that produce chlorine using the mercury cell method. EPA plans to issue a proposed rule by November 2000 and a final rule by November 2001. The rule will be based on best available control technologies and stringent management practices.

Municipal Solid Waste Landfills - OAR is developing a rule that will address emissions of HAPs from municipal solid waste landfills using the MACT approach. EPA plans to issue a proposed rule by November 2000 and a final rule by September 2001. This source category includes contiguous geographical space/facilities receiving household waste, and other types of Resource Conservation and Recovery Act (RCRA) Subtitle D waste, such as commercial solid waste, non-hazardous sludge, conditionally exempt small quantity generator waste and industrial solid waste.

Table 2. EPA Regulatory Activities Affecting Mercury Releases to the Environment.

Program Office/Region	Regulatory Activities	Fiscal Year Target Date
Office of Air and Radiation		
Regulatory Determination for Electric Utilities	Promulgate Rule on Mercury Controls for Utilities	2005
	Attain Full Compliance by Utilities Industry	2008
Maximum Achievable Control Technology Standards 1. Chlor-Alkali Facilities 2. Landfills	Promulgate MACT Proposals for Chlorine Production, and Municipal Landfills	2001
	Attain Full Compliance with MACT Proposals for Chlorine Production and Municipal Landfills	2004
Integrated Urban Air Toxics Strategy	Develop Initial Urban Area Source Standards	2002
	Complete Urban Area Source Standards	2004
	Attain Full Compliance with Urban Area Source Standards	2009
Office of Water		
Revisions to Mercury Water Quality Criteria	Revise Human Health Water Quality Criterion for Mercury (TMDLs)	2001
Office of Solid Waste and Emergency Response		
Land Disposal Restrictions on Mercury MACT Standards	Propose Land Disposal Restriction for Mercury-bearing Hazardous Wastes	2001
	Propose Phase 2 MACT Rule for Hazardous Waste Combustion	2001
	Propose MACT Standards for Boilers and Industrial Furnaces Burning Hazardous Wastes	2001

Urban Area Source Standards: The Integrated Urban Air Toxics Strategy (Federal Register, 1999) is an important part of EPA's national air toxics program. Under the national air toxics program, EPA has and will continue to develop a number of national standards for stationary and mobile sources to improve air quality in urban and rural areas. The Urban Air Toxics Strategy complements the existing national efforts by focusing on further reductions in air toxics emissions in urban areas. Emissions standards are currently under development or have already been issued for sixteen categories (Federal Register, 1992). The other thirteen area source categories are new to the EPA's Source Category list. EPA anticipates promulgating emissions standards for these additional categories in FY 2004. Full attainment will be in FY 2009.

Human Health Water Quality Criterion for Mercury and Total Maximum Daily Loads (TMDLs): The Office of

Water (OW) is developing a revised human health water-quality criterion for mercury. This revised human health criterion is scheduled for release in FY 2001. In the longer term, there is a programmatic need for a wildlife criterion which would protect birds and terrestrial animals from the effects of mercury. OW is conducting two pilot projects for water bodies impaired by airborne deposition of mercury. If the methodology is successfully demonstrated, TMDLs¹ will be developed, mostly by the states, for all such water bodies.

Land Disposal Restrictions for Mercury-bearing Hazardous Wastes: The Office of Solid Waste and Emergency Response (OSWER) is re-evaluating land disposal restrictions on mercury to consider alternatives to mercury recovery and incineration. EPA is considering publication of a proposed rule to revise the 40 CFR Part 268 Land Disposal Restrictions treatment standards applicable to

mercury containing wastes. The revisions under consideration by the Agency will involve a comprehensive re-evaluation of waste treatment standards. A proposed rule is scheduled for FY 2001.

Phase 2 MACT Rule for Hazardous Waste Combustion: OSWER is planning to issue a proposal establishing MACT standards for emissions of HAPs, including mercury, from boilers and industrial furnaces which burn hazardous waste. This rule follows on the Phase 1 hazardous waste combustion MACT rule which set standards for incinerators, cement kilns, and lightweight aggregate kilns which burn hazardous waste. A schedule for the proposed rule has not been established but could occur in FY 2001.

MACT Standards for Boilers and Industrial Furnaces Burning Hazardous Wastes: EPA regulates air emissions from hazardous waste combustors and boilers and industrial furnaces (BIFs) under RCRA. The Office of Solid Waste (OSW) is currently developing MACT standards for hazardous-waste-fired industrial, commercial, and institutional boilers and two more types of industrial furnaces -- halogen acid and sulfuric acid recovery for FY 2001.

3.2.2 Special Initiatives

Special Agency initiatives and activities that support the development of the *Mercury Research Strategy* are described below.

Persistent, Bioaccumulative Toxics Initiative: EPA is committing, through the Persistent, Bioaccumulative, Toxics (PBT) Initiative to create an enduring cross-office program addressing the multimedia issues associated with priority PBT pollutants. Mercury was identified as a priority PBT, and the Agency convened the Mercury Task Force (MTF) to develop a Mercury Action Plan. The cross-agency work group that developed this action plan is continuing to look for opportunities to address mercury through a more integrated, multimedia approach.

The Great Lakes Binational Toxics Strategy: The Great Lakes National Program Office (GLNPO) is undertaking voluntary efforts to remove mercury from wastes, products, and processes, with a goal of a 50 percent reduction by the mid-2000s (EPA, 1997c). This is a joint undertaking between the United States and Canada and addresses not only mercury, but eleven other PBTs.

Hazardous Waste Reduction Voluntary Program: The Office of Solid Waste and Emergency Response (OSWER) is undertaking a voluntary effort to reduce the volume and content of PBTs (including mercury) in hazardous wastes by 50 percent before the end of FY 2005.

In all cases, these important Agency priorities benefit from ORD research, both in terms of the assessment of mercury

risks to humans and wildlife and the characterization and management of risks from mercury sources.

3.2.3 International Activities

A number of bilateral and multilateral programs offer the United States an opportunity to promote and engage in cooperative mercury efforts. These international activities allow all nations to better understand and ultimately reduce the risks of mercury and methylmercury exposures (Table 3). While some opportunities are voluntary and others entail legally binding commitments, EPA's involvement in international efforts is conducted within the context of its existing statutory authority, especially with respect to the Clean Air Act, as amended. Rather than being driven by, or reacting to, international initiatives on mercury, the Agency is trying to influence them proactively.

The United Nations Economic Commission for Europe (UNECE), Convention on Long-Range Transboundary Air Pollution (LRTAP) for Heavy Metals (UNECE, 1998): In February 1998, the LRTAP Parties (47 member countries, including the U.S., all in the Northern hemisphere) concluded negotiations on a legally binding protocol on mercury and other heavy metals. The protocol includes obligations to control mercury emissions from stationary sources and to establish, update, and report mercury emission inventories. It also contains obligatory and voluntary provisions regarding the use of mercury in products.

The U.S. and 35 other LRTAP Parties signed the Heavy Metals protocol in June 1998, agreeing in principle to comply with the protocol even before it formally entered into force. As of July 2000 six countries had ratified the protocol; ten more ratifications are required for the protocol to enter into force. The U.S. is in the process of completing the steps required for ratification. Best Available Technology (BAT) standards for new and existing stationary sources must be applied two and eight years, respectively, after the protocol is in force. In addition, EPA will submit reports on its domestic inventory updates and other matters by late 2000 and annually thereafter.

The Arctic Environmental Protection Strategy (AEPS) (Arctic Council, 2000): The AEPS, ratified in 1991 by the eight Arctic nations, is implemented through five working groups, two of which are most pertinent to mercury: the Arctic Monitoring and Assessment Program (AMAP) and the Protection of the Arctic Marine Environment (PAME). AMAP is responsible for monitoring the levels and assessing the effects of selected anthropogenic pollutants in all compartments of the Arctic. AMAP teams are collecting data on sources transport, transformation, and effects of persistent organic pollutants and heavy metals. Mercury was designated by the international heavy metals team to be the priority metal for AMAP Phase II: Trends and Effects 1998-2002.

Table 3. International Mercury Activities that Support the Development of the *Mercury Research Strategy*.

Program Office/Region	Multi-National Provisions	Target Date
Office of Air and Radiation		
UNECE LRTAP Convention, Heavy Metals Protocol	Apply BAT to New Stationary Sources by 2 Years after Entry into Force of Protocol	Upon Promulgation of MACT standard
	Apply BAT to Existing Stationary Sources by 8 Years after Entry into Force of Protocol	Upon Promulgation of MACT standard
Office of Air and Radiation & Office of Research and Development		
UNECE LRTAP Convention, Heavy Metals Protocol	Submit Domestic Emissions Inventory Updates and Research Results to Support Annual Assessment of Protocol Compliance Results	2000 and annually thereafter
Office of International Activities, Office of Research and Development, & Region 10		
Arctic Council - Arctic Monitoring and Assessment Program	Progress Report on 2nd Phase of Heavy Metals Assessment	2000
	Arctic Council Ministerial Report on 2nd Phase Assessment Results	2002
	Final Arctic Council Ministerial Report on 2nd Phase Assessment Results	2006
Office of Prevention, Pesticides, and Toxic Substances		
CEC North American Regional Action Plan on Mercury	Coordinate Implementation of the Mercury NARAP Phase II over the Next Several Years.	2000 - 2005
Region 5; GLNPO; OPPTS; all EPA Offices		
The Great Lakes Binational Toxics Strategy	Seek 50 percent Reduction Nationally in Deliberate Use of Mercury, and 50 percent Reduction in Releases of Mercury from Sources (air and water) Caused by Human Activity.	2006
	Virtual Elimination of Mercury	Beyond 2006
Region I; all EPA Offices		
The North East Governors-Eastern Canadian Premiers Mercury Action Plan (June 1998)	Virtual Elimination of Anthropogenic Discharge of Mercury	2003

A progress report on heavy metals was presented to the Arctic Council Ministers in Barrow, Alaska in October 2000. It includes preliminary results of the first verification of the Arctic Sunrise phenomenon at Barrow where elemental mercury in the atmosphere suddenly depletes. Over the next year, these and other data will be combined, interpreted, and incorporated into the Heavy Metals Phase II final report due in September 2002. An Arctic Council Action Plan (ACAP) is being developed. This action plan will identify opportunities for international cooperation to eliminate pollution in the Arctic, targeting mercury and

persistent organic pollutants. In addition, the PAME working group is drafting a regional action plan to reduce pollution emissions from land-based sources. The action plan includes voluntary commitments by Arctic Council members to reduce emissions of persistent organic pollutants and heavy metals.

The North American Regional Action Plan on Mercury (CEC, 2000): The North American Regional Action Plan (NARAP) for mercury is one of a number of regional undertakings that have stemmed from the North American

Agreement on Environmental Cooperation (NAAEC) between the governments of Canada, Mexico, and the United States. The NAAEC established the Commission for Environmental Cooperation (CEC) to facilitate activities among the three countries. Under CEC Resolution #95-05, the Sound Management of Chemicals (SMOC) Working Group was established. This working group has been involved in developing four NARAPs on PBTs of national and regional concern, one being mercury.

The Mercury NARAP was developed in two phases. Phase I was approved by the CEC Council in October 1997. It set out the strategic framework and approach to be used by the three countries as well as the ultimate goal. The goal is to reduce mercury releases from human activities to levels comparable to naturally occurring levels and fluxes. Phase II, approved June 2000, fully endorses the overarching objectives and goal of Phase I. It identifies specific mercury use and release reduction actions that the three countries will undertake individually within their countries, and together through a coordinated tri-national effort. An implementation plan will be developed by mid-2001.

The Great Lakes Binational Toxics Strategy (EPA, 1997c): On April 7, 1997, the United States and Canada signed the Great Lakes Binational Toxics Strategy. The strategy establishes a collaborative process to virtually eliminate persistent bioaccumulative, toxic substances resulting from human activity in the Great Lakes basin. For mercury, the strategy sets a U.S. challenge of reducing the use and release of mercury 50 percent nationwide by 2006. The Canadian challenge is to reduce the release of mercury 90 percent in the Great Lakes basin by 2000. The baseline for the U.S. challenges is the most recent year for which there was an inventory available at the time the strategy was signed. For the release challenge, the baseline year is 1990; for the use challenge, the baseline is the U. S. Geological Survey's 1995 mercury consumption estimate.

The Northeastern States and Eastern Canadian Provinces Mercury (NESCAUM, 1998): On June 8, 1998, the New England Governors/Eastern Canadian Premiers (NEG/ECP) signed a resolution concerning mercury and its impacts on the environment and adopted the Mercury Action Plan, which has as its regional goal "the virtual elimination of the discharge of anthropogenic mercury into the environment." The NEG/ECP has established a task force to coordinate and implement the Mercury Action Plan. The plan identifies 45 specific actions to reduce mercury emissions. These actions include: emission reduction targets for specific source categories (e.g., municipal waste combustors, medical waste incinerators, sludge incinerators, utility and non-utility boilers, industrial and area sources), source reduction, and safe waste management of mercury.

ORD has made a concerted effort to engage the Office of International Activities (OIA) and those Regions involved in the above programs in the preparation and review of the *Mercury Research Strategy*. Each will benefit from the

scientific information and technical data resulting from the implementation of the strategy.

1. A TMDL is developed for a water body if water quality standards within the body are not being met using technology-based or other effluent controls. It establishes the maximum allowable pollutant loading for a water body (including allocations for point and non-point source loads and a margin of safety) that will result in compliance with established water quality standards (EPA, 1999c).