Draft Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion

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This guidance provides advice on how to implement the water quality criterion recommendation for methylmercury that the U.S. Environmental Protection Agency (EPA) published in January 2001. This guidance does not impose legally binding requirements on EPA, states, tribes, other regulatory authorities, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA, state, tribal, and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those in the guidance where appropriate. EPA may update this guidance in the future as better information becomes available.

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8 Related Programs

8.1 How does pollution prevention play a role in the methylmercury criterion?

Under the national pretreatment program, POTWs routinely control the volume and concentration of pollutants contributed by significant industrial users (SIUs)[23] to their collection system and wastewater treatment plant. However, as water quality criteria, sludge standards, and air emissions become more restrictive, even low levels of pollutants such as mercury might cause noncompliance with these standards. As such, POTWs must either expand pollutant control efforts or install treatment technologies to remove the problem pollutants.

In many cases, large-scale treatment technology is either not yet available or not economically feasible for controlling mercury at POTWs. Instead, POTWs are choosing to develop and implement pollution prevention (P2) strategies to reduce the amount of mercury received by the wastewater treatment plant. Although SIUs can contribute a significant mercury load to the treatment plant, non-SIU sources can also be identified as causing or contributing to the problem. For example, the Western Lake Superior Sanitary District (WLSSD) determined that one SIU and many small non-SIUs (dental facilities) contribute a major portion of the mercury in their wastewater. Sectors historically more difficult to control (e.g., residential) or beyond the POTW's direct control (e.g., pollutants in contaminated inflow/rainfall) can also contribute substantial loadings.

Effective mercury source reduction relies on the POTW effectively communicating to sector entities that minimal individual efforts can collectively reduce the mercury loading to the environment. Forming partnerships and working with sector representatives to investigate mercury sources, explore alternatives, and assist in implementation of selected options is integral to a successful reduction strategy. Permitting authorities developing a P2 plan should consider a POTWs role in compliance assistance. The sections below provide summary level guidance for developing a POTW P2 plan.

Through the pretreatment program, POTWs should maintain close contact with local sewer dischargers and have a good understanding of specific industrial process operations. Thus, they can uniquely promote P2 to numerous facilities and provide public awareness and education. In general, success of a POTW P2 effort depends upon a behavioral change on the part of the POTW and the community. As noted by the City of Palo Alto, "Experience shows that people are more likely to change their behaviors if they fully understand environmental problems and the range of possible solutions if they have participated in the process leading to a policy decision and if they believe regulators are dealing with them in good faith...." (City of Palo Alto 1996). By undertaking the

[23] EPA defines an SIU as (1) any Industrial User (IU) subject to a categorical pretreatment standard (national effluent guidelines); (2) any user that discharges an average of 25,000 gallons per day or more of process wastewater or that contributes a process waste stream making up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or (3) any other user designated by the Control Authority (POTW) to be a SIU on the basis that it has a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement (40 CFR 403.3(t)).

following activities prior to developing its plan, the POTW might minimize community resistance and apathy:

- Conduct a preliminary investigation of the problem and potential sources. Verify that the problem is not a wastewater treatment plant operational issue. Further, identify internal sources and any area government facilities in addition to industrial, commercial, and uncontrollable sources that could be contributing to or causing the problem.

- Meet with upper management (e.g., utility director, mayor, council) and discuss the problem, preliminary findings, and potential ramifications. Upper management support will be essential for obtaining necessary resources, funding, equipment, and authority for implementing a P2 plan. Their support will also be necessary for resolving any wastewater treatment plant and government facility issues. Upper management may also advise development of a POTW mission statement that declares goals and the chosen approach. Exhibit 1 provides an example of the WLSSD mission statement (WLSSD 1997).

Exhibit 1. Example Mission Statement

The WLSSD Commitment to Zero Discharge

The WLSSD as a discharger to Lake Superior is committed to the goal of zero discharge of persistent toxic substances and will establish programs to make continuous progress toward that goal. The District recognizes step-wise progress is only possible when pollution prevention strategies are adopted and rigorously pursued. These approaches will focus upon our discharge as well as indirect sources.

WLSSD will work with its users to implement programs, practices, and policies which will support the goal. We will call upon the resources and assistance of the State and federal governments for support, including financial support of the programs to ensure that our users are not penalized unfairly.

WLSSD recognizes that airborne and other indirect sources beyond District control must be addressed in order for significant reductions to occur.

- Establish a workgroup composed of representatives from government, industry, community, and environmental organizations, preferably those that are either familiar with P2 strategies or familiar with the pollutant of concern. The workgroup likely will develop or help develop the plan, guide plan implementation, and measure plan success. Therefore, findings from the preliminary investigation will guide the POTW to select appropriate committee members and experts. Bear in mind that the workgroup size should ensure representation of most interests but not grow so large as to be counterproductive. This group could also prove valuable in disseminating information.

With the support and expertise needed, the POTW and workgroup can draft a plan by doing the following:

- *State the problem* to provide background information about the POTW, problems caused by mercury, and why the POTW is taking action (described in terms the most people can understand).

- *Identify the goals* to determine if the POTW intends to help minimize mercury introduced to all environmental media (air, water, solid waste), known as "front-end" P2, or merely minimize the amount of mercury discharged to the wastewater treatment plant. The latter option ignores mercury transfers to other media (e.g., air, solid waste) and is the less environmentally sound option. It may be essential for the POTW to implement a front-end P2 approach and establish waste collection programs for the proper recycling/disposal of mercury-bearing wastes (e.g., thermometers, fluorescent light bulbs).

- *Define an approach* that outlines the sectors selected for P2 efforts, the criteria for targeting efforts (e.g., size of the source loading, authority available to control the source or sector, time necessary to produce desired results), where efforts will be voluntary or mandatory, who will execute the various program efforts, and how the POTW will proceed where mercury introduction is beyond its control (e.g., contaminated stormwater).

- *Identify assessment techniques* that identify how the POTW will monitor influent, effluent, sludge, and sources to assess success and that identify possible follow-up activities to ensure P2 measures continue to be implemented.

- *Create contingency plans* that describe actions to be taken if planned efforts do not succeed, such as obtaining authority to mandate and enforce P2 or other source control requirements or installing wastewater treatment plant technology.

Plans might develop in response to a specific problem (e.g., elevated wastewater treatment plant effluent mercury levels) or proactively to minimize potential problems. Plans will vary in complexity and in resources necessary to achieve goals. Plan updates should detail successful and failed efforts such as in the form of lessons learned.

8.2 What regulations has EPA issued pursuant to the CAA to address air emissions of mercury?

As rules and standards pursuant to the CAA have been developed, proposed, and promulgated since 1990, compliance by emitting sources and actions taken voluntarily have already begun to reduce emissions of mercury to the air across the country. EPA expects a combination of ongoing activities will continue to reduce mercury emissions to the air over the next decade.

EPA has made substantial progress in addressing mercury air emissions under the CAA. In particular, EPA has issued regulations addressing the major contributors of mercury to the air, including, for example, municipal waste combustors, medical waste incinerators, chlor-alkali plants, industrial boilers, and hazardous waste combustors. EPA issued regulations for these source categories under different sections of the CAA, including sections 111, 112, and 129. Indeed, as the result of EPA's regulatory efforts, the United States achieved a 45 percent reduction in domestic mercury air emissions between 1990 and 1999 (see Figure 4 and http://www.epa.gov/ttn/chief/trends/index.html). Most recently, EPA issued a regulation under CAA section 111 that directly regulates mercury emissions from coal-fired power plants (see 70 FR. 28,606 (May 18, 2005) (codified at 40 CFR Parts 60, 72, and 75) (standards for power plants)).

The relevant regulations that EPA has issued to date under the CAA are described briefly below.

8.2.1 Municipal Waste Combustors

In 1995, EPA promulgated final regulations that apply to all new and existing waste-to-energy plants and incinerators with the capacity to burn more than 250 tons of municipal solid waste, including garbage, per day (see 60 FR 65,415 (Dec. 19, 1995), codified at 40 CFR Part 60). These regulations cover approximately 130 existing waste-to-energy plants and incinerators, and any new plants and incinerators built in the future. The regulations have reduced emissions of a number of HAPs, including mercury, by approximately 145,000 tons per year. The regulations have resulted in about a 90 percent reduction in mercury emissions from domestic municipal waste combustors from 1990 emissions levels (see Figure 4 (56.7 tons per year of mercury emitted from domestic municipal waste combustors in 1990 versus 4.9 tons per year in 1999)).

8.2.2 Medical Waste Incinerators

Medical waste incinerators (MWIs) are used by hospitals, health care facilities, and commercial waste disposal companies to dispose of hospital waste and medical or infectious waste. EPA adopted regulations controlling mercury emissions from MWIs on September 15, 1997 (62 FR 48,348, codified at 40 CFR Part 60, subpart Ce). EPA estimated that the regulations would reduce mercury emissions from these facilities by about 90 percent, with all existing MWIs required to comply with the regulations by September 15, 2002 (see Figure 4 (49.7 tons per year of mercury emitted from domestic municipal waste incinerators in 1990 versus 1.6 tons per year in 1999)). At the time the regulations were issued, EPA expected that 50 percent to 80 percent of the 2,400 then-existing MWIs would close in response to the rule. In fact, EPA's rule resulted in a significant change in medical waste disposal practices in the United States. Because of the increased cost of on-site incineration under the final rule, few health care facilities are likely to install new MWIs and many health care facilities have discontinued use of their existing MWIs. Instead they have switched to other methods of waste disposal such as off-site commercial waste disposal. EPA expected the standards to apply to between 10 and 70 new MWIs, most of which would employ mercury control technology by the compliance deadline.

8.2.3 Chlor-alkali Plants

On December 19, 2003, EPA issued final regulations to reduce mercury emissions from chlorine production plants that rely on mercury cells (see 68 FR 70,904, codified at 40 CFR Part 63 subpart IIIII). The regulations impose requirements for more stringent work practice limits, representing the best practices from the industry, than were required by a preexisting regulation that covered this source category. Today, there are 9 such plants in the United States, as compared to 20 when work on the rule began. The regulations, which require a combination of controls for point sources, such as vents and management practices to address fugitive air emissions, will reduce mercury air emissions from existing chlor-alkali plants by about 50 percent by the compliance date of December 19, 2006. In

addition, EPA is initiating a study of fugitive mercury emissions at existing chlor-alkali plants, which could result in the proposal of further regulatory changes in the future.

8.2.4 Industrial Boilers

In September 2004, EPA issued a final rule to limit emissions of HAP, including mercury, from new and existing industrial, commercial, and institutional boilers and process heaters (ICI boiler and process heaters) at major stationary sources (see 69 FR 55,218 (Sept. 13, 2004), codified at 40 CFR Part 63, Subpart DDDDD). ICI boilers and process heaters burn coal and other substances such as wood to produce steam to generate electricity or mechanical energy and to provide heat. ICI boilers and process heaters are used at facilities such as refineries, chemical and manufacturing plants, and paper mills. In addition, boilers can stand alone to provide heat for shopping malls and university heating systems. EPA promulgated emissions limitations for mercury for all new solid fuel boilers and process heaters and for large existing solid fuel units. EPA expects that this rule will reduce total emissions of HAP from regulated sources by 50,000 to 58,000 tons per year (see 69 FR 55,218, 55,244). The largest segment of emissions and projected emissions reductions from these sources involve hydrogen chloride. However, EPA expects that the standards will reduce mercury emissions from new and existing facilities by about 2 tons per year.

8.2.5 Hazardous Waste Combustors

In 1999, EPA established standards for HAPs, including mercury, for incinerators, cement kilns, and lightweight aggregate kilns that burn hazardous waste under CAA section 112 (64 FR 52,828, 53,011 (September 30, 1999)). The 1999 standards were challenged and subsequently vacated by the United States Court of Appeals for the District of Columbia Circuit. In 2002, EPA issued interim emission standards, which are found at 40 CFR 63.1203 (a)(2) and (b)(2) (mercury standards for existing and new hazardous waste burning incinerators), section 63.1204 (a)(2) and (b)(2) (mercury standards for existing and new hazardous waste-burning cement kilns), and section 63.1205 (a)(2) and (b)(2) (mercury standards for existing and new hazardous waste-burning lightweight aggregate kilns). Recently, EPA issued a rule that supersedes the interim standards issued in 2002 (see 70 FR 59,402 (Oct. 12, 2005) (final standards for hazardous air pollutants from hazardous waste combustors: Phase 1 Final Replacement Standards and Phase II)). The October 2005 rule sets mercury standards under CAA section 112 for specific types of sources, including some sources that were not covered by the interim standards (e.g., liquid fuel fired boilers and solid fuel fired boilers).

8.2.6 Coal-fired Power Plants

On March 15, 2005, EPA issued the first-ever federal rule to permanently cap and reduce mercury emissions from coal-fired power plants (see 70 FR 28606 (May 18, 2005) (CAMR)). This rule makes the United States the first country in the world to regulate mercury emissions from coal-fired power plants. The CAMR, which builds on EPA's CAIR (70 FR 25,162 (May 12, 2005)), will significantly reduce mercury emissions from coal-fired power plants. When fully implemented, CAIR and CAMR will reduce coal-fired utility emissions of mercury from 48 tons a year to 15 tons, a reduction of nearly 70

percent. EPA expects that air deposition from these utilities will also decrease by nearly 70 percent (see Figure 9).

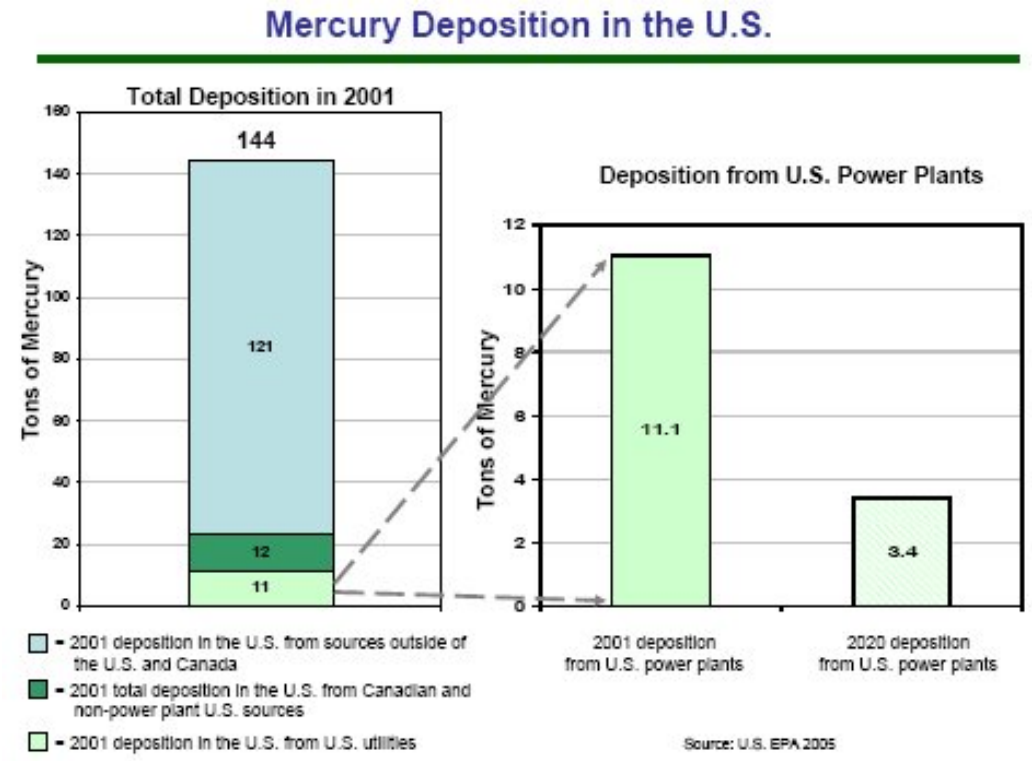

Figure 9. Mercury deposition in the United States following CAMR and CAIR

The CAMR establishes "standards of performance" limiting mercury emissions from new and existing coal-fired power plants and creates a market-based cap-and-trade program that will reduce nationwide utility emissions of mercury in two distinct phases. The first phase cap is 38 tons, and emissions will be reduced by taking advantage of "co-benefit" reductions—that is, mercury reductions achieved by reducing sulfur dioxide (SO2) and nitrogen oxides (NOx) emissions under CAIR. In the second phase, due in 2018, coal-fired power plants will be subject to a second cap, which will reduce emissions to 15 tons upon full implementation.

EPA's modeling shows that the first phase of CAMR will significantly reduce the majority of coal-fired power plant mercury emissions that deposit in the United States, and those reductions will occur in areas where mercury deposition is currently the highest. The CAMR is expected to make additional reductions in emissions that are transported regionally and deposited domestically, and it will reduce emissions that contribute to atmospheric mercury worldwide. Mercury emitted from coal-fired power plants comes from mercury in coal, which is released when the coal is burned. While coal-fired power plants are currently the largest remaining source of human-generated mercury emissions in the United States, they contribute very little to the global mercury pool. Recent estimates of annual total global mercury emissions from all sources—both natural and human-generated—range from roughly 4,400 to 7,500 tons per year. Human-caused U.S. mercury emissions are estimated to account for roughly 3 percent of the

global total, and U.S. coal-fired power plants are estimated to account for only about 1 percent.

In addition to EPA's regulatory efforts under the CAA, in 1996, the United States eliminated the use of mercury in most batteries under the Mercury Containing and Rechargeable Battery Management Act. This action reduces the mercury content of the waste stream, which further reduces mercury emissions from waste combustion. In addition, voluntary measures to reduce use of mercury containing products, such as the voluntary measures committed to by the American Hospital Association, will contribute to reduced emissions from waste combustion.

For more information about CAMR and other CAA actions to control mercury, see http://www.epa.gov/mercury/control_emissions/decision.htm.