STATEMENT OF
EPHRAIM KING
DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY
U.S. ENVIRONMENTAL PROTECTION AGENCY
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OF THE
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Good afternoon, Mr. Chairman and Members of the Subcommittee. I am Ephraim King, Director of the Office of Science and Technology in the Office of Water, at the U.S. Environmental Protection Agency (EPA). I appreciate this opportunity to discuss mercury in dental amalgam and actions EPA is taking to address its releases and other releases of mercury.

INTRODUCTION

Mercury is a naturally occurring element. It enters the environment from natural sources (such as volcanoes) and human activity (such as industrial combustion and mining). Mercury is widespread in both the U.S. and the global environment. Human activities have increased the amount of mercury in the atmosphere; in soils and sediments; and in lakes, streams, and oceans. While there are significant efforts to reduce mercury use, it continues to be used in some industrial processes such as chlorine manufacturing and in some products such as batteries, light bulbs, and thermometers. Mercury persists in the environment, and, under certain conditions, can be transformed by microorganisms into methylmercury, the form of mercury of greatest concern in the U.S., where exposures occur primarily through fish consumption. This transformation enables mercury to bioaccumulate through the aquatic food chain. The higher concentrations are found at the top of the food chain in larger predatory fish, such as shark and swordfish.

EPA is effectively using its legislative mandates under the Clean Air Act (CAA), Clean Water Act (CWA) and other laws to reduce the U.S. contribution to the worldwide environmental mercury burden. We continue to pursue our goals of limiting toxic releases to ensure increased public health benefits and environmental welfare. For example, the National Pollutant Discharge Elimination System (NPDES) permits under the CWA specify effluent limitations where necessary to protect water quality. For municipal wastewater treatment plants (i.e., Publicly Owned Treatment Works [POTWs]) that are subject to these effluent limitations, the National Pretreatment Program requires control of commercial and industrial sources of pollutants before they reach the POTWs. Under the CAA, EPA has substantially limited U.S. emissions of mercury to the atmosphere through Maximum Achievable Control Technology (MACT) and solid waste combustion/incineration regulations. As a result, the U.S. has cut its emissions by over 90% from two of the three largest categories of sources -- municipal waste combustion and medical waste incineration – since 1990. For the other largest category, in 2005, EPA finalized the first-ever regulations to reduce mercury emissions from coal-fired electric utilities – the Clean Air Mercury Rule (CAMR) – which is expected to further reduce mercury emissions from power plants by about 70% from 1999 levels at full implementation.

MERCURY IN DENTAL WASTE

Dental amalgam contributes a small proportion of all mercury released to the environment from human activities. Mercury-containing amalgam wastes may find their way into the environment when new fillings are placed or old mercury-containing fillings are drilled out and waste amalgam materials that are flushed into chair-side drains enter the solid waste stream. Dental facilities may employ a variety of controls and management practices to reduce the discharge of mercury amalgam in wastewater. Management practices include the use of precapsulated alloys, proper disposal and recycle of captured amalgam, and avoiding the use of oxidizing cleaning agents and heat disinfection for amalgam containing materials.

Application of these practices in conjunction with traps and vacuum pump filters can reduce discharges of mercury-containing amalgam in wastewater by over 75 percent. Amalgam separators remove particulate mercury amalgam and in combination with traps and vacuum pump filters achieve better than 95 percent removal.

Some of the waste amalgam particles that reach the sewer system settle out in the sewers, and some are carried to POTWs. The physical processes used in POTWs remove about 95% of the mercury received in wastewater. The mercury removed from wastewater then resides in the biosolids or sewage sludge generated during primary and secondary treatment processes. The Association of Metropolitan Sewerage Agencies (AMSA, now known as the National Association of Clean Water Agencies) in a March 2002 study reported that mercury from domestic wastewater and municipal treatment plants accounts for less than one percent of U.S. mercury entering the environment.

Three of the more common use or disposal practices for sewage sludge are application to land, placement on a surface disposal site, and firing in a sewage sludge incinerator. Numeric standards for mercury, and other pollutants in EPA's biosolids regulations are based on conservative multi-pathway exposure and risk assessments. The ceiling concentration for mercury in land applied biosolids is 57 milligrams per kilogram on a dry weight basis.

Under the Part 503 Regulation, Publicly Owned Treatment Works (POTWs) are required to demonstrate that the total mercury emissions from all of the biosolids incinerators located at their site does not exceed the mercury National Emission Standards for Hazardous Air Pollutants (NESHAP) limit of 3,200 grams/24-hour. In almost all cases, compliance is demonstrated by reviewing available data concerning the mercury concentration in their biosolids and making a worst case assumption of zero percent mercury removal efficiency for their air pollution control devices (i.e., mercury in the biosolids equals mercury

emitted to the atmosphere). NACWA found that mercury emissions from biosolids incineration facilities are typically substantially below the NESHAP limit described above.

Dental amalgam is also a source of mercury air emissions, though it is a relatively small source when compared to a number of other source categories, such as coal-fired power plants, industrial boilers, and hazardous waste incinerators. EPA estimates that about 1.5 tons (or a little more than 1%) of total U.S. mercury air emissions are due to dental amalgams, of which only a small fraction comes from crematoria. EPA does not currently regulate air emissions associated with dental amalgams. Our priority has been to first control the bigger contributors of mercury air emissions including medical waste incinerators, municipal waste combustors and power plants which emitted about 70 percent of the total U.S. mercury emissions in 1990.

Actions to Reduce Mercury Emissions Associated with Dental Amalgams

Preventing dental amalgam from getting into the water in the first place reduces the amount of dental amalgam and, thus, mercury in wastewater. The American Dental Association (ADA) has identified many Best Management Practices (BMPs), including chair-side screens and traps. On October 2, 2007, the ADA updated its BMPs to include the use of amalgam separators. Amalgam separators are also available at relatively low cost to remove fine particles of waste amalgam. Several studies, including one conducted by EPA's Environmental Technology Verification Program, show separators are highly effective.

Another way to reduce the amount of amalgam entering the sewers is for dentists to use mercury-free fillings. Alternatives to mercury-containing dental amalgams exist. As fewer mercury-containing dental amalgams are used, they will become less of a source of mercury in the environment. We encourage dentists to consider non-mercury dental amalgams, however, the choice of dental treatment rests solely with dental professionals and their patients.

In 2006, EPA initiated a study to collect and compile information on mercury discharges from dental offices, BMPs, and control technologies (such as amalgam separators) and their costs. This study is being conducted under the effluent guidelines planning authority in section 304(m) of the Clean Water Act.

Through the NPDES permit and the National Pretreatment Programs, EPA encourages POTWs to implement pollution prevention strategies that reduce the amount of mercury they receive. Effective mercury source reduction relies on the POTW effectively communicating the fact that small scale individual efforts can collectively reduce mercury released to the environment. Forming partnerships and working with sector representatives to investigate mercury sources, explore alternatives, and assist in implementing selected options are integral parts of a successful reduction strategy. For example, the City of San Francisco has a goal of installing amalgam separators in all 900 dental offices in the city. They are offering assistance and incentives to those dental offices least able to afford the separators – specifically those serving low-income communities. Additionally, the Western Lake Superior Sanitary District determined that one industry and many small other sources, including dental facilities, contributed a major portion of the mercury in their wastewater. With respect to dental offices, the local POTW in Duluth, Minnesota, worked with the local dental offices to produce a manual containing BMPs on proper disposal of mercury in amalgam. Monitoring by the POTW shows that the amount of mercury discharges from those dental offices has been reduced by over two-thirds.

OTHER MERCURY RELATED WATER ACTIONS

Under the Clean Water Act, EPA develops recommended water quality criteria. States then adopt these criteria into water quality standards to protect public health and the environment. These levels can be used to set permit limits. In January 2001, EPA published a new water quality criterion for methylmercury that is expressed as a fish and shellfish tissue value (0.3 parts per million) rather than as a

water column value. Because different water conditions may affect conversion of mercury to methylmercury differently, a fish tissue value more accurately represents the levels of potential human concern. The States are starting to adopt the new criteria in their water quality standards. To date 13 states and five tribes have adopted these fish-tissue based criteria.

However, nearly all fish and shellfish contain traces of mercury, and would continue to contain traces of mercury, even if all new loadings of mercury to the environment were eliminated. Some fish and shellfish contain higher levels of mercury that may harm an unborn baby or young child's developing nervous system. The risks from mercury in fish and shellfish depend on the amount of fish and shellfish eaten and the levels of mercury in the fish and shellfish. Therefore, in 2004 the Food and Drug Administration (FDA) and EPA issued advice that women who may become pregnant, pregnant women, nursing mothers, and young children should avoid eating certain types of fish that are higher in mercury (such as shark and swordfish) but that they should eat up to 12 ounces a week of fish and shellfish that are lower in mercury (such as shrimp and salmon). EPA and FDA recently reaffirmed this advice despite recent national news reports on a recommendation encouraging women of child-bearing age to consume unlimited amounts of fish, including fish higher in mercury.

To implement the Great Lakes Water Quality Guidance, the states in EPA Region 5 established water quality standards in 1995 (1.3 ng/l for protection of wildlife and 1.8 ng/l for human health protection) for the Great Lakes and their tributaries. This was the first time water quality standards took into account the effects of mercury on birds and mammals that consume contaminated fish. These very stringent standards have proven challenging to comply with as there is presently no treatment technology for mercury capable of achieving this standard. However, EPA's Region 5 office, working with the states, developed Regional Mercury Pollutant Minimization Program (PMP) Guidance and the states are requiring permittees, including POTWs, to implement PMPs to move them towards compliance with the standard.

Control of dental amalgam is expected to play a significant role in reducing loadings of mercury to POTW systems in the Great Lakes states.

CONCLUSION

In closing, let me assure the Committee that EPA is committed to understanding and reducing mercury-related risks to citizens and the environment. We will continue to use our authorities to call for cost-effective reductions of environmental releases of mercury that present human health or environmental risks.

We will continue to use our authorities to reduce environmental releases of mercury. As an additional resource, I would direct the Committee to EPA's 2006 Roadmap for Mercury which describes the latest information on mercury sources, the Agency's progress in addressing mercury issues domestically and internationally, and outlines EPA's major ongoing and planned actions to manage such risks.

Mr. Chairman, this concludes my statement. I would be happy to answer any questions you or your colleagues may have.