TESTIMONY OF
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Good afternoon, Mr. Chairman and Members of the Subcommittee. I am Nancy Stoner, Deputy Assistant Administrator for 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 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 (EPA, 1997). 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, 1997).

Mercury is a serious issue and EPA is 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. People in the U.S. are mainly exposed to methylmercury, an organic compound, when they eat fish and shellfish that contain methylmercury. Fetuses, infants, and children are considered most susceptible to the effects of methylmercury, although effects have been observed in adults as well. Methylmercury exposure in the womb, which can result from a mother's consumption of fish and shellfish that contain methylmercury, can adversely affect a baby's growing brain and nervous system. Impacts on cognitive thinking, memory, attention, language, and fine motor and visual spatial skills have been seen in children exposed to methylmercury in the womb. Recent human biological monitoring by the Centers for Disease Control and Prevention in 1999 and 2000 indicate that the majority of women of childbearing age have blood mercury levels below a level associated with possible health effects. More recent data from the CDC support this general finding.

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, coal-fired power plants, EPA is now in the process of developing a MACT standard that will address mercury and other hazardous air pollutants from coal- and oil-fired power plants. We plan to issue a proposal under the MACT program no later than March 2011, and have been court-ordered to issue a final regulation no later than November 2011.

Just last month, EPA proposed MACT regulations to significantly reduce mercury air emissions from another large source category: industrial, institutional and commercial boilers. Under this proposal, these new requirements would be effective in early 2014. EPA plans to finalize air emission standards in

December of this year to address mercury and other air pollutant emissions from both new and existing sewage sludge incinerators.

We estimate that about 103 tons per year of mercury are emitted into the air from all U.S. sources (based on the EPA's 2005 National Emissions Inventory). Of these 103 tons, only about 1.5 tons (or 1.5 percent) are related to dental amalgams, with an estimated 0.3 tons emitted from cremation, 0.6 tons from sewage sludge incineration, and 0.6 tons from dental preparations.

EPA understands that you have an interest in our emissions factors program that is used to develop emissions inventories and to help state and federal authorities set permitting requirements and evaluate control strategies for air pollution. EPA's emissions factors program is currently being updated and and our goal is to complete the updated program in late 2011-early 2012. The revised program will provide the tools to allow emissions factors for sources such as wastewater sludge incinerators to be generated from information provided by regulated entities. This information is generally obtained by conducting stack tests using published test methods. As a result, emissions factors are usually developed for sources that emit air pollutants through a stack or vent.

EPA understands that you are also concerned about airborne mercury from combined sewer overflow, septic systems, sludge that is landfilled or spread on land, and waste removed as grit and fines at wastewater treatment plants and disposed of in various ways. Obtaining information on mercury air emissions from these sources will be technically challenging and expensive, and we expect emissions from these sources to be relatively low compared to the other larger sources mentioned before. It is important to note that these larger sources are typically industrial processes in which heat is applied or which process large amounts of mercury-containing materials. The water-related processes you have raised concerns

about generally operate at ambient temperatures and thus are not expected to contribute significantly to airborne mercury emissions.

EPA is also committed to reducing mercury discharges to our nation's waters. 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. In April, EPA published final guidance for implementing the January 2001 Ambient Methylmercury Water Quality Criterion for the Protection of Public Health. This document will help protect waters and human health by giving guidance to states, territories, and authorized tribes (states and tribes) for adopting a fish tissue-based methylmercury water quality criterion into their water quality standards and implementing the criterion through other water quality programs. Last fall, EPA also initiated effluent guideline rulemaking under the CWA to address mercury and other wastewater discharges from power plants. This regulation will focus largely on discharges associated with coal ash handling operations and wastewater from flue gas desulfurization (FGD) air pollution control systems. The use of wet FGD systems to control sulfur dioxide (SO_2) emissions has increased significantly since the effluent guidelines for this industry were last revised in 1982 and is projected to increase substantially in the next decade as power plants take steps to address federal and state air pollution control requirements. FGD and coal ash wastewater can contain detectable levels of metals, including bioaccumulative pollutants such as mercury, arsenic and selenium.

Mercury in Dental Waste

Dental amalgam contributes a small portion of all mercury released globally to the environment from human activities. However, at the local level, data indicate that discharges from dental facilities can be

a significant contributor to mercury in the environment (de Cerreño, et. Al. 2002). Mercury-containing amalgam wastes may find their way into the environment when old mercury-containing fillings are drilled out and waste amalgam materials are flushed into chair-side drains entering the sewer system. 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 recycling 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 (EPA, 2008). Amalgam separators remove particulate mercury amalgam and, in combination with traps and vacuum pump filters, achieve better than 95 percent removal (EPA, 2008).

Some of the waste amalgam particles that reach the sewer system settle out in the sewers, and some are carried to POTWs. The processes used at POTWs remove about 95% of the mercury present in wastewater (AMSA, 2002). The mercury removed from wastewater then resides in the biosolids or sewage sludge generated during wastewater treatment. The currently named National Association of Clean Water Agencies (NACWA) 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 (AMSA, 2002).

Three of the more common disposal practices for sewage sludge are application to land, placement on a surface disposal site or into municipal solid waste landfills, and incineration. 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 (40 CFR 503).

Under 40 CFR Part 503, POTWs are required to demonstrate that the total mercury emissions from all of the sewage sludge 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).

In 2009, EPA completed the Targeted National Sewage Sludge Survey (TNSSS). The purpose of the survey was to determine which contaminants were present in sewage sludge and obtain national estimates of the concentrations of selected contaminants (EPA, 2009). The information will help EPA in assessing if exposures may be occurring and whether those levels in sewage sludge may be of concern. EPA has conducted three previous surveys for the purposes of identifying contaminants in sewage sludge. The most recent 2009 survey collected sewage sludge samples, in 2006 and 2007, from 74 randomly selected POTWs in 35 states. For this survey, EPA focused its efforts on POTWs that treat more that one million gallons of wastewater per day (MGD). This group of facilities collectively represents those facilities that treat approximately 94% of the wastewater in the nation. Results of the study found a maximum average mercury concentration of 7.5 milligrams per kilogram of sewage sludge. This falls well below the land application ceiling of 57 milligrams per kilogram of biosolids.

Actions to Reduce Mercury Emissions Associated with Dental Amalgams

Preventing dental amalgam from getting into the sewer in the first place reduces the amount of dental amalgam and, thus, mercury in wastewater. On October 2, 2007, the American Dental Association (ADA) updated its Best Management Practices (BMPs) to endorse the use of amalgam separators by dentists. 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 (EPA, 2002).

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, the amount of mercury in the environment will decline. We encourage dentists to consider non-mercury alternatives to traditional amalgam, however, the choice of dental treatment rests solely with dental professionals and their patients.

For a number of years EPA and its regional offices have been reaching out to state and local governments and dentists about the benefits of using amalgam separators. Moreover, in 2009, EPA and Marquette University's School of Dentistry developed an environmentally responsible dentistry teaching module to educate dental students on proper amalgam waste management. The module aims to raise dental students' awareness of the dental amalgam waste issue and to provide the students with practical steps to reduce the release of amalgam waste to the environment. The module, titled *Dental Amalgam Recycling: Principles, Pathways, and Practices*, highlights four actions to properly manage amalgam waste. These actions are abbreviated as GRIT: "Gray Bag It," "Recycle It," "Install It," and "Teach It." The GRIT steps highlight ADA's best management practices for amalgam waste and encourage dental students to practice environmentally responsible dentistry.

Every other year EPA publishes a final Effluent Guidelines Program Plan as required by Section 304(m) of the CWA. The plan addresses both categories of direct and indirect dischargers (i.e., facilities that discharge to POTWs). EPA publishes a preliminary plan to give the public an opportunity to comment on the plan before it is final. EPA selected the health services industry for study in the 2006 final plan, based in part on public comments concerning the discharge of mercury from dental offices and dental laboratories.

As part of its Preliminary 2008 Effluent Guidelines Program Plan, EPA received comments from the ADA and NACWA on dental amalgam. These comments led to discussions of voluntary efforts and ultimately served as the basis for the Memorandum of Understanding on Reducing Dental Amalgam Discharges (MOU), signed in December 2008.

The purpose of this agreement between EPA, ADA, and NACWA is to have dental offices follow the ADA BMPs, which includes the installation of an amalgam separator, proper maintenance of such separators, and recycling of all amalgam waste collected in dental offices. The Voluntary Dental Amalgam Discharge Reduction Program also calls for the establishment of performance goals for installations of new amalgam separators by dentists, and for the tracking of these goals.

In 2009, as called for in the MOU, ADA conducted both an internet-based and mail survey of dentists in an attempt to determine current amalgam separator use. The internet survey had a response rate of 14.6% with 51% of all respondents indicating they had installed an amalgam separator. In states without laws mandating separator use, amalgam separator use was 36.3%. The mail survey had a response rate similar to the internet survey, with 39.7% of all respondents indicating amalgam separator use. In non-mandatory states, amalgam separator use was 28.1%. Because of the low response rates to these surveys, there is concern that a valid separator baseline from which to measure further progress cannot be established. EPA is now exploring whether sales data from amalgam separator manufacturers is an effective indicator of progress under the MOU. EPA is also exploring goals for this voluntary program and the idea of a recognition program for dentists who voluntarily install amalgam separators. EPA is discussing these issues with both ADA and NACWA, the other signatories to the MOU. Moreover, EPA has been discussing these issues with the Quicksilver Caucus, a coalition of State environmental associations who are concerned with mercury discharges, under an informal agreement to consult with them before any decisions are made under the MOU.

In our 2008 Effluent Guidelines Program Plan, we committed to continue to examine the use of amalgam separators by dentists. As part of our 2010 effluent guidelines planning process, EPA intends to re-evaluate whether a rulemaking is appropriate. EPA will be issuing its 2010 Program Plan late this calendar year and will specifically address this issue.

Conclusion

In closing, let me assure the Subcommittee that EPA is committed to reducing mercury-related risks to citizens and the environment. In this regard, EPA and state representatives have scheduled a June 24 meeting to kick off an EPA/state dialogue on mercury. The purpose of this dialogue is to identify gaps, set priorities, enhance EPA/state collaboration, and identify future areas of work. All media program offices at EPA will be represented at this meeting.

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

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