Midnight Deal on Dental Mercury

How the Bush EPA's agreement with the American Dental Association undermines pollution prevention

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Report by the Mercury Policy Project / Tides Center

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Executive Summary

A hold over deal from the Bush administration is allowing tons of dental mercury pollution into the environment each year that could otherwise be prevented. The December 2008 agreement between the Bush Administration's Environmental Protection Agency (EPA), the American Dental Association (ADA) and the National Association of Clean Water Agencies (NACWA) stands in stark contrast to pollution reduction initiatives now underway for most other mercury sources both at home and abroad.

This report examines the scope of the problem of mercury pollution from the dental sector, the ADA's resistance to mandatory mercury pollution prevention strategies, opportunities to reduce mercury pollution, and the EPA's lack of action to ensure effective dental mercury pollution prevention.

During the waning days of the Bush administration, EPA political appointees let the U.S. dental sector off the hook through a midnight deal with the ADA through a Memorandum of Understanding (MOU)[1] that endorsed ADA's voluntary mercury reduction initiative and forestalled a mandatory pollution prevention program.

Dental amalgam is by far the largest source of mercury pollution to waste water treatment plants. According to EPA, "Mercury discharges [in wastewater] from dental offices far exceeded all other commercial and residential sources." EPA cited an estimate in 2007 that 36 percent of the mercury reaching municipal sewage treatment plants is released by dental offices. Other investigations have put the figure closer to 50 percent.

Mercury from dental amalgams is also a significant source of airborne emissions. Congressional hearings conducted in 2007 and 2008 revealed significant disparities between the Agency's estimate of 1.5 tons per year of dental mercury released to air compared with more recent estimates provided by an EPA scientist that was three times higher. Factoring in other amalgam air pathways that EPA left out and based on new research, this report estimates that atmospheric emissions from dental mercury could be more than six times the 2002 EPA estimate, due primarily to increasing emissions from cremation.

Securing accurate estimates of dental mercury air releases is important because the record indicates that EPA prioritizes its activities based in part on the amount of mercury releases from a particular industry sector to the atmosphere. Yet EPA continues to significantly underestimate the amount of air pollution that dental mercury accounts for, thereby rendering this problem a lower priority in the Agency's comprehensive mercury reduction strategy.

While not regulated nationally, ten states have mandated pollution control requirements (called "amalgam separators") at dental clinics. The combination of amalgam separators and best management practices can eliminate 95%-99% of dental mercury releases to wastewater.

In response to the momentum of expanding state and local mandatory programs, ADA through its state chapters has successfully organized opposition to state requirements and squashed progress since 2008. In the same year, ADA also took federal action to ensure they were kept off the hook, as the new administration prepared to take office and could have imposed a mandatory national mercury reduction program for dentists.[2]

Although not known at the time, it is clear now that the Bush Administration's EPA worked secretly with the ADA to develop a sweetheart deal for the dental sector that resulted in the MOU. State officials, environmentalists and even the EPA regional offices were not allowed in the process. Through the MOU, both EPA and NACWA bought into a program where ADA was given free rein to delay a mandatory program under the guise that a voluntary program would eventually work to prevent mercury pollution — provided that they were given enough time.

Both the Bush EPA and the ADA knew that the MOU would not significantly reduce mercury pollution. The secret contract cited one-sided or plainly erroneous sources. But the midnight deal bought time and continues to provide EPA with the rationale not to move forward with effluent guidelines for dental offices.

Clear evidence of the failure of voluntary programs had been documented by a 2008 congressional study which cited numerous cases where the programs didn't realize significant compliance.[3] Since then, the Quicksilver Caucus, a coalition of state government organizations focusing on mercury issues, has found that amalgam separator installation rates are low unless there is a mandatory component.[4]

In summary, the problem with this midnight deal is that it allows significant and preventable mercury pollution releases to the air and water. The deal was based on faulty information, left ADA in charge of developing baseline data before goals could be set, is being unduly delayed, and lacks openness, transparency and follow through. Voluntary educational outreach program might be justified for a *de minimis* pollution source, but is clearly not adequate for this significant source of mercury pollution. By following the recommendations below in timely manner, EPA can achieve significant reductions in dental mercury pollution.

Recommendations

1) **EPA should maintain an open and transparent process to address dental mercury.** Non-governmental organizations should be recognized as full stakeholders in this process, be kept informed of all developments and allowed to participate in agency stakeholder meetings concerning dental mercury.

2) **EPA should develop regulations to prevent mercury pollution from the dental sector.** EPA should terminate the MOU and work with all relevant stakeholders to achieve significant reductions in dental mercury releases in a timely manner.

3) **EPA should update its emissions inventory and regulate crematoria.** EPA should update its outdated 2002 emissions inventory for dental mercury and correct its misrepresentation that the dental community has "made significant progress through voluntary efforts." EPA should also regulate mercury emissions from cremation, given that this source is significant and growing.

4) **EPA should establish guidelines for mercury discharges from dental facilities.** EPA should establish effluent guidelines, including installation of amalgam separators and implementation of best management practices for all dental mercury discharges.

5) **EPA technical documents should clearly state that pollution controls are required when mercury is a pollutant of concern.** EPA should coordinate within the Water Program and with the states to ensure that technical guidance clearly states that mercury controls are required where mercury is a pollutant of concern consistent with the Clean Water Act.

Introduction

Dental facilities are a substantial source of mercury, a potent neurotoxin that is released both to water and to air. Several studies have estimated that the dental sector accounts for 50% or more of the mercury entering municipal wastewater systems, where it concentrates in the sludge. Releases to air are also significant. Mercury used in dental devices, in the form of amalgam fillings, is present in the teeth of many Americans. When the mercury from amalgam is released, it also contributes in various ways to the global mercury burden and gets taken up in the fish Americans eat.

The primary sources of mercury waste that originate in the dental clinic include:

- amalgam waste generated producing amalgam fillings for use in the procedure;
- the excess material carved from new amalgam fillings;
- the removal of old amalgam fillings;
- the removal of teeth containing amalgam;
- mercury emissions directly to the air; and
- the traps, filters and other devices in dental clinics to remove mercury from the wastewater.

Only approximately 20% of the states have mandates to adequately control releases of dental mercury into wastewater.

ADA has included amalgam separators as part of their Best Management Practices since 2007, but working with its state chapters, it has successfully blocked any further pollution prevention mandates since 2008. In addition, there are multiple air pathway releases of dental mercury to the environment resulting in significant (and growing) emissions. These releases are generally uncontrolled as well, and not acknowledged by EPA to be a significant problem. As discussed in greater detail below, neither of these sources is being adequately controlled by the EPA, and any plans for doing so appear "gridlocked," even after two congressional oversight hearings.

Table 1. Eleven States Require Best Management Practices and Amalgam Separators

State	Year	Mandate
Connecticut	2003	Law
Maine	2004	Law
New Hampshire	2005	Rules
Washington	2005	Rules
Vermont	2006	Rules
New York	2006	Rules
Massachusetts	2007	Law
Rhode Island	2007	Law
New Jersey	2007	Rules
Oregon	2011	Law
Michigan	2013	Law

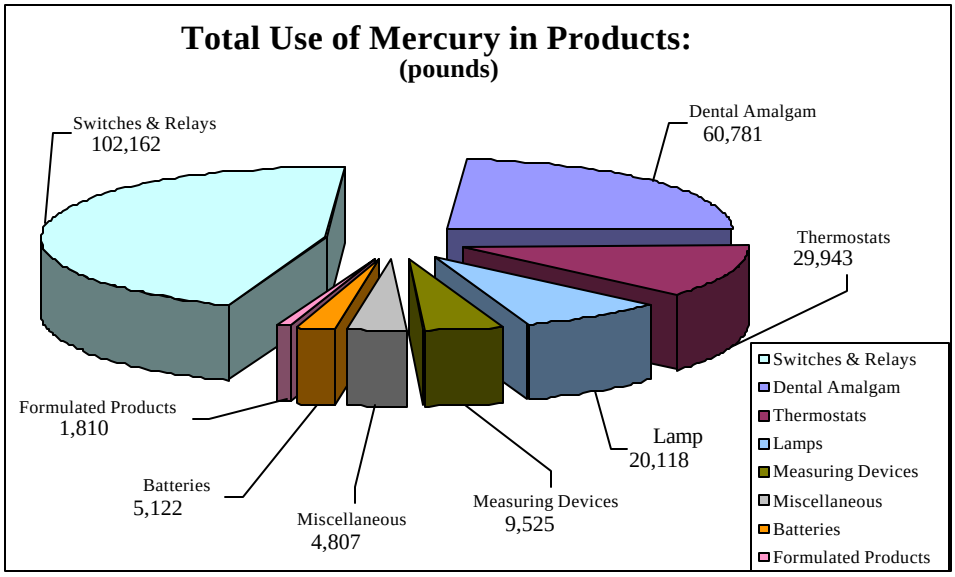
State laws and/or rules have been adopted in eleven states, and numerous municipalities, requiring employment of best management practices, including amalgam separators, in dental offices.

Sources of Dental Mercury Pollution

Discharges from dental facilities into water

Dental offices are the second largest user of mercury, after switches and relays, as demonstrated in Figure 1, and those large quantities add to the mercury disposal burden.

Figure 1 – U.S. Mercury Consumption in 2004



Amalgam use was the second largest use of mercury in 2004, according to several estimates.

Given that amalgam lasts between ten and twenty years, it is reasonable to assume that the same quantities of mercury used when they were placed will end up being disposed somewhere, if they are not collected and recycled. Mercury contained in the existing dental fillings of Americans is one of the largest reservoirs of mercury in the United States. According to an EPA estimate, dental amalgam comprises over half of all mercury in use, amounting to over 1000 tons in 2004.[6]

Mercury from amalgam waste in sewer lines results in direct discharges of mercury to waterways from combined sewer overflows during high flow storm events.

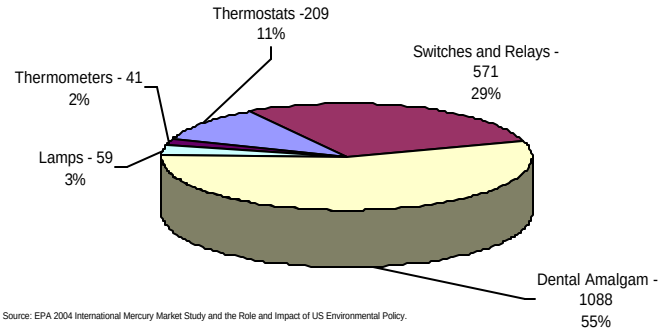
Thousands of miles of sewer pipelines have become the repository of many tons of dental mercury that will contribute to sewage treatment plant influent mercury levels for years to come. Dental mercury releases also contributes to water via human wastes, runoff from land disposal and landfilling of contaminated sewage sludges, etc.

As discussed in the next section, significant quantities of dental mercury are also released to the atmosphere when the mercury-containing residues of sewage plants is incinerated, and after the sludge is applied to agricultural land or landfilled. Elemental mercury is released during chewing or drinking liquids, as well as when corpses containing mercury dental fillings are cremated.

Studies also clearly show that dental mercury has also been shown to contaminate the fish we eat.[7] Mercury from amalgam waste may be converted to methylmercury in sewage lines and septic systems, which was confirmed in a study by a researcher from the U.S. Navy.[8] Methylmercury is not typically trapped by a sewage treatment process and is therefore discharged with the wastewater effluent or volatilizes, polluting the air. This is backed up by the following statement on EPA's website:

"When amalgam enters water, certain microorganisms can change it into methylmercury, a highly toxic form that builds up in fish, shellfish and ani-

Figure 2. U.S. Reservoirs of Mercury Use



In 2004, there were over 1,000 tons of mercury in use in tooth fillings in the United States.

mals that eat fish. Fish and shellfish are the main sources of methylmercury exposure to humans."[9]

Emissions to air

Amalgam use contributes significant quantities of mercury pollution into the air. Yet there are major discrepancies between the outdated estimates from EPA about the total amount of emissions and other more updated estimates.

The 2002 EPA National Emissions Inventory put atmospheric emissions related to dental mercury at 1.5 tons (Table 2). The EPA numbers are compared with estimates submitted in 2007 testimony provided by the Mercury Policy Project (MPP), summarized in the second and third columns, which suggest air emissions could be more than 6 times higher than EPA estimates.[10]

As the table shows, EPA has still not developed estimated emissions for several sources, including: dental mercury in sludge that is landfilled or spread on agricultural or forest land, or that is dried before it is used as fertilizer; in infectious and hazardous waste; in general municipal waste; in human respiration; or removed as grit and fines at wastewater treatment plants and disposed of in a number of ways, including septic systems and in combined sewer overflows.

This is surprising, given that atmospheric releases of dental mercury in the United States are clearly significant when compared with other major mercury source categories (Table 3), and will be a much greater percentage once pollution controls are installed.[11]

Table 2. Comparison between EPA Inventory and MPP Estimates for Dental Mercury Releases to the Atmosphere

Pathway	EPA 2002 Inventory	MPP Low Estimate 2005	MPP High estimate 2005
Human cremation	0.3	3.0	3.5
Dental clinics	0.6	0.9	1.3
Sludge incineration	0.6	1.5	2.0
MSW disposal	NA	0.2	0.5
Infectious/hazardous	NA	0.5	0.7
Human respiration	NA	0.2	0.2
Total	**1.5**	**7.1**	**9.4**

While EPA estimates 1.5 tons of mercury were released into the air in 2002, high/low estimates from MPP estimated between 7. 1 tons and 9.4 metric tons of mercury released to air.

Table 3. U.S. Anthropogenic Mercury Air Emissions Reported by EPA's National Emissions Inventory (NEI) by Source Category: 1990 and 2005

Source Category	1990* Mercury Emissions (tons/yr)***	2005** Mercury Emissions (tons/yr)
Coal-fired utility boilers	58.8 (23.9%)	52.3 (50.9%)
Municipal waste combustors	57.2 (23.2%)	2.4 (2.3%)
Medical waste incinerators	51.0 (20.7%)	0.2 (0.2%)
Industrial, commercial & institutional boilers & heaters	14.4 (5.8%)	7.4 (7.2%)
Mercury-cell chlor-alkali plants	10.0 (4.1%)	1.1 (1.1%)
Electric arc furnaces	7.5 (3.0%)	7.3 (7.1%)
Hazardous waste Incineration ****	6.6 (2.7%)	4.1 (4.0%)
Portland cement non-hazardous waste****	5.0 (2.0%)	7.5 (7.3%)
Industrial gold mining	4.4 (1.8%)	2.4 (2.3%)
Mobile sources	(NA)*****	1.1 (1.1%)
Other (numerous very small sources)	31.5 (12.8%)	16.9 (16.5%)
Total	**246.4 (100%)**	**102.7 (100%)**

EPA estimated nearly 250 tons of mercury released to the air in 1990, dropping to 100 tons of mercury in 2005.

* Source: EPA 1990 National Emissions Inventory (NEI), 11/14/2005.
** Source: EPA 2005 National Emissions Inventory (NEI), 2005 NATA NEI, 07/01/2009
*** Ton = short ton = 2000 pounds.
**** Hazardous waste incineration category includes Portland cement hazardous waste kilns. 1990 estimates for Portland cement and hazardous waste incineration do not use the same methodology and are underestimated in 1990 based on current data.
***** Not available. Mobile sources estimates are only available for 2002 and 2005.

Mercury releases from sewage sludge

In its 2002 inventory, EPA estimated airborne mercury attributable to wastewater sludge incineration to be 0.6 ton per year. Yet this figure appears to significantly undercount sludge-related mercury pollution. The Northeast States for Coordinated Air Use Management estimated that mercury emissions in sludge emissions *in the northeast alone* amount to 0.5 tons per year.[12] According to a northeastern state official, sludge incineration is a significant source of mercury emissions in the northeast.

> "Sewage sludge incinerators were estimated to be the third largest point source of mercury emissions in the northeast prior to regional requirements that dentists use amalgam separators, and accounted for over 1,100 pounds of mercury or 12% of total emissions. This estimate did not include releases from wastewater or land applied sewage sludge, which would significantly increase the total."[13]

EPA admits that its mercury emission data for sludge incineration is "poor," a deficiency it attributes to both the small number of facilities tested and the fact that these facilities were not a random sample of the industry.[14]

Mercury releases from cremation

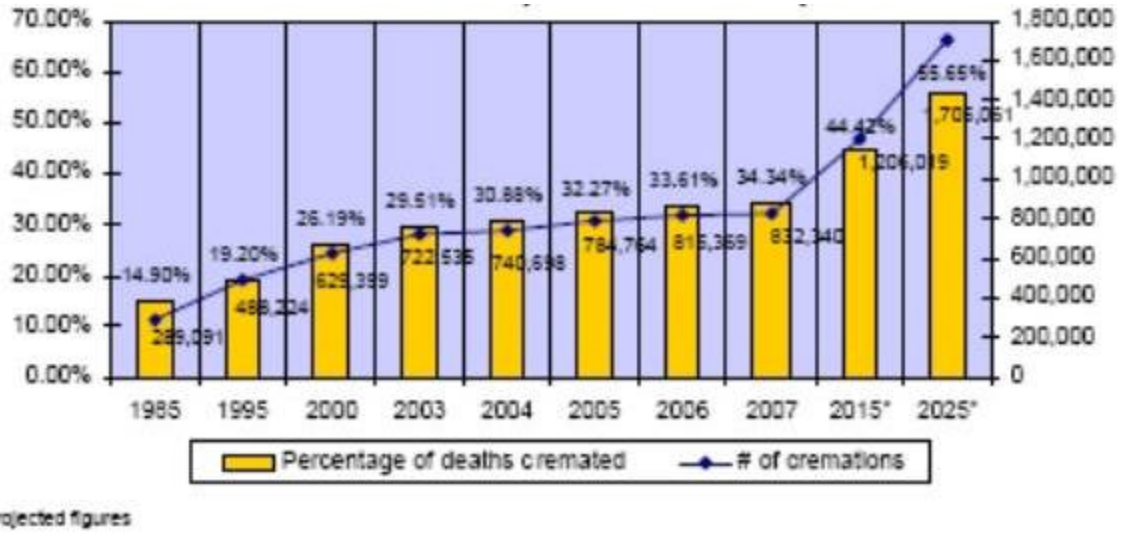
EPA's earlier estimate from cremation significantly understates the magnitude of mercury emissions. As discussed above, EPA's estimate of total mercury emitted as a byproduct of cremation of human remains to be around 0.3 tons per year. The official estimate is based entirely on one test conducted at a single crematorium 10 years ago, and does not explain the difference between the amount of mercury in fillings and the amount of mercury measured in emissions.[15] However, a 2007 published article co-authored by an EPA Region 5 environmental scientist estimates mercury emissions from cremation at about 3 tons per year, ten times the earlier EPA estimate.[16]

According to the Cremation Association of America, there are about 1,900 crematoria in the United States. Nationally, over 30% of Americans are now cremated, a figure that is anticipated to rise to just under 56% by 2025. From 2005 data, the EPA scientist estimated that about 3.3 tons of mercury were emitted by crematoria that year,[17] which is acknowledged on EPA's website.[18] In the model used by the EPA scientist, 25% of these emissions were assumed attached to particulates, which would settle to the ground locally and be classified as land deposition, and 75% assumed to be elemental mercury emissions to the atmosphere.

The chart below from the Cremation Association of America provides an indication of U.S. cremation trends and projections to 2025, which are significantly greater than earlier projections.[19]

Based on a literature review including ground deposition studies in New Zealand and Norway,[20] it appears reasonable to allocate up to 90% of the mercury entering crematoria as emissions to the atmosphere, with some of the

Figure 3 – Cremation Data & Predictions



Cremation is projected to grow significantly over the next 15 years.

balance retained, at least temporarily, in combustion equipment and the stack. This type of "mass balance" approach is often utilized for estimating releases, especially where hard data is lacking, and can be adjusted once such testing occurs.

In the model prepared for EPA Region 5, it was estimated that 30% of all deaths in the US would be handled by cremation. The data estimated 2,688,478 total deaths, with an average of 12 fillings per body, and each amalgam having an average of 0.31 grams of mercury. Thus, the amount of mercury in the restorations of those cremated was estimated as 2,961 kilograms (6526 pounds) per year.[21]

New data provided by the Cremation Association of North America (CANA) estimates that the 2010 cremation rate in the United States will be just under 36%, with 946,400 cremations, while the rate in 2020 will be about 50%, with 1,456,040 cremations. This is compared to the estimate of 796,058 cremations used in the Region 5 EPA model (29.61% of 2,688,478 total deaths). Thus, the estimate of the EPA scientist for 2010 is 25% too low compared to the CANA estimate, while by 2020, the number of cremations will be 83% larger than the estimate of the model for 2005-2010.[22]

In the next 15 years, emissions from crematoria are expected to rise considerably. The chart below from the Cremation Association of America provides an indication of U.S. cremation trends and projections to 2025, which are significantly greater than earlier projections.

There are two simultaneous trends contributing to this: a rise in the average number of fillings per person cremated and a rise in the number of cremations.[23] In the past, many corpses had relatively few – if any – of their own teeth, due to losses of teeth. For example, according to a study by U.S. Centers for Disease Control and Prevention (the National Health and Nutrition Examination Survey (NHANES)) in the late 1980s and early 1990s, the presence of teeth in U.S. adults was significantly lower among adults above age 55 as compared to younger adults. By age 55, the average adult had less than half of their teeth, while by 75, the number had fallen to less than a third of their teeth.

However, improved health care has resulted in more people retaining more teeth throughout their lives, which also means more restorations, including amalgam fillings, in corpses. This situation will change in time, as the younger generation has benefited from even better dental health care not only to retain more teeth, but to have fewer restorations.

While exact data in the United States on these trends are not available – especially the use and estimates for amalgam fillings – we can get an indication of this from work done in Europe, especially the United Kingdom (U.K.).[24]

In a U.K. report from 2003, it was estimated that the amount of mercury per cremation would increase by 42% from 2005 to 2020, based solely on the increased number of teeth, and hence restorations, per person. If the same would apply in the United States, the total amount of mercury emitted would increase by 160% due to a 83% increase in the number of cremations and a 42% increase in mercury per cremation. **Thus, rather than 6,516 pounds a year, the total mercury emission would be about 16,944 pounds per year.**[25]

The EPA has put out several documents on mercury emissions from cremation, but the data are inconsistent. In one study,[26] a value of 1.5×10^{-3} kg (1.5 grams) of mercury per cremation is reported, from a 1992 test done in California of a propane fired crematorium. The EPA report does not provide data on the age of the deceased, or the number and size of the fillings and the mercury estimated to be contained in the fillings.[27]

Table 4. Estimates of Mercury Emissions from U.S. Crematoria

Year and Source	U.S. Deaths	Cremation Rate	Cremations	Mercury per Cremation	Total Mercury
2005-2010 *	2,688,478	29.61%	796,058	3.72 grams	6,526 pounds
2010 **	2,634,000	35.93%	946,396	3.72 grams	8,177 pounds
2020 ***	NA	50%	1,456,040	5.28 grams	16,944 pounds

Mercury emission from cremation are projected to more than double over the next ten years.

* EPA Region 5 Mercury Flow Model.
** CANA estimates for number of deaths and cremations, 2003.
*** Interpolation of CANA estimates for the number of deaths and cremations, 2007 trends analysis, and U.K. estimates of increased quantity of mercury per cremation on a percent basis, based on increased presence of teeth.

In the second EPA report from the same year,[28] the amount of mercury is reported at 0.94×10^{-6} kg/body (0.94×10^{-3} gram/body) or less than 1/1000th of the other EPA report from the same year. The test results were said to have been obtained from a confidential test report to the California Air Resource Board (which may, in fact, be same report quoted in the other EPA report).[29]

Two years later, in 1999, EPA was a partial sponsor of a test of mercury emissions at the Woodlawn crematorium in Brooklyn, said to have been the only crematorium in the U.S. with any emissions control equipment.[30]

However, these tests were done with no apparent review of the literature of other countries, with no statistical controls on whether the bodies cremated were representative of the national cremation practices, and with no mass balances of the mercury into and out of the crematorium. Questions remain with several of the researchers found to be unhappy with either the way the tests and data quality were done as well as the way that the cremation industry has used the data.[31]

At this time, there are no standards for regulating mercury emissions from crematoria in the United States. Under Section 129 of the Clean Air Act, EPA is required to set standards for a variety of air sources. Originally, the standards for crematoria were to be developed by November 2000, and in a *Federal Register* notice at that time, EPA set a new schedule to release its standards by November 15, 2005. However, EPA came to the conclusion in 2004:

> "... that the human body should not be labeled or considered 'solid waste.' Therefore, human crematories are not solid waste combustion units and are not a subcategory of OSWI for regulations. If EPA or States determine, in the future, that human crematories should be considered for regulation, they would be addressed under other authorities."[32]

Yet other countries, including the U.K., have recognized mercury emissions as a significant source and have set standards to reduce pollution. Standards were set in the U.K. in the fall of 2004 and then further revised in the spring of 2005.

The original standard called for no regulation of existing crematoria and, for new crematoria, a maximum release of 150 milligrams per four cremations, with a concentration limit of 50 micrograms/cubic meter of exhaust gas. In the revised standard, 50% of all cremations at existing crematoria are to be subject to mercury abatement, with a deadline of 31 December 2012. The regulations allow for "burden sharing" – instead of each crematorium installing controlling equipment, several crematoria can share the cost of abatement equipment so that 50% of the cremations of the pooled crematoria have mercury abatement.[33]

EPA Fails to Cut Mercury Pollution

Hearings fail to motivate EPA to push for dental mercury reduction results

Due to the dental sector's significant contribution of mercury into the environment, the Domestic Policy Subcommittee held hearings in November 2007, *Environmental Risks of Mercury Dental Fillings*, and July 2008, *Assessing State and Local Regulations to Reduce Dental Mercury Emissions*. The hearings included testimony from federal officials, dental professionals and organizations, amalgam separator manufacturers, environmental experts and state and local government officials who have championed efforts to reduce dental mercury pollution, and found that:

> "The most widely used and best known technology to prevent mercury solids from entering dental wastewater discharge is known as an amalgam separator unit. An amalgam separator is a wastewater treatment device installed at the source, rather that the POTW, that removes 95 to 99% of the mercury from dental wastewater."[34]

Subsequently, Domestic Policy Subcommittee Chairman Dennis Kucinich asked then-EPA Administrator Steve Johnson for a response to testimony provided at the hearings,[35] particularly related to the Agency's outdated 2002 emission inventory estimates for dental mercury. As discussed earlier, air releases were estimated to be more than 6 times higher than the EPA's 2002 estimates.[36] The Kucinich letter noted that "EPA has even expressed a lack of confidence in some of its estimates" and "... furthermore, there are a number of other emission pathways for which EPA has failed to develop any estimates."

EPA continues to cling to its increasingly outdated dental mercury air estimates from 2002. For example, a March 6, 2008 EPA response to Chairman Kucinich reaffirmed the Agency's 2002 estimates that roughly 1.5 tons of dental mercury is emitted each year, of which 0.3 tons is emitted from cremation; 0.6 tons emitted from sewage sludge incineration; and 0.6 tons emitted from dental preparation. Yet the letter also suggests that "these estimates could be as much as two times higher."[37]

A follow up letter was sent from Chairman Kucinich to the EPA Administrator in January 2010, again honing in the discrepancies between the EPA dental mercury releases to air versus those presented during the congressional hearings.[38] While the April 5, 2010 response indicated that the Agency was very committed to reducing mercury pollution both at home and abroad, few specifics were given in response to the questions raised in the congressional letter.[39]

EPA's reply to Kucinich's inquiry raised specific concerns: EPA's apparent unwillingness to update it estimates of mercury emissions from crematoria or develop emissions factors for other air pathways. EPA's letter states that there is a lack of good empirical data on mercury emissions from crematoria, but doesn't provide a plan for gathering such data. Yet this information is available outside the United States, and it would not be costly to obtain this data or, in the interim, utilize a mass balance approach, as described earlier in this report.

Further, it is critical for EPA to address this issue now, since the number of cremations is rapidly rising and, simultaneously, the number of amalgam fillings per body cremated is rapidly increasing.[40] This "perfect storm" combination is resulting in increasing mercury releases from a significant source that the EPA still mistakenly underestimates at only 0.3 tons per year.

EPA-ADA MOU perpetuates delays in reducing dental mercury pollution

EPA has had a history under previous administrations of ignoring the significant and growing discharge of dental mercury and instead promoting voluntary initiatives by the ADA even where mandatory programs were indicated. ADA initiated its voluntary program for best management practices (BMPs) in 2003. In October 2007, the ADA's BMPs were amended to include the recommended use of amalgam separators.[41] The ADA published its first report in 2002 on amalgam separators, followed by articles in 2003 and 2008.[42] Therefore, the need to install amalgam separators as part of BMPs to protect the environment was well-established years ago.

In the waning days of the Bush administration, political appointees gave the U.S. dental sector an avenue to avoid the mounting pressure for national regulations to require dentists to reduce their mercury pollution.[43] On December 29, 2008, EPA, ADA and the National Association of Clean Water Agencies (NACWA) signed an MOU to ad-

dress the issue of dental mercury discharges and suggest installation of separators as a "voluntary" program. As stated in the MOU, EPA "...did not identify...the dental sector...for rulemaking" because they have demonstrated "...significant progress through voluntary efforts" and were therefore "a lower priority for effluent guidelines, particularly where such reductions are achieved by a significant majority of dentists utilizing amalgam separators."

Even though found to be false, this is the same rationale ADA uses on its website today to placate EPA and foster continuing delays.

> "Last year the Environmental Protection Agency (EPA) announced plans for a 'Study of a Pretreatment Requirement for Dental Offices,' pointing to the possibility of a national mandate for amalgam separators. The ADA argued that a national pretreatment standard for dental offices was not necessary because dentistry was already acting voluntarily to address environmental impacts from dental amalgam. The ADA pointed out support of its position that the use of amalgam separators is part of the ADA's Best Management Practices (BMP). The EPA agreed and concluded that a national standard was not warranted at that time. Following this, EPA proposed an agreement among EPA, ADA and National Association of Clean Water Agencies (NACWA) to further promote voluntary compliance with ADA's BMPs, including the use of amalgam separators."[44]

Unfortunately, the Bush EPA believed the myth that voluntary programs could achieve adequate dental mercury pollution reductions, as stated in their MOU.[45] It was also used as EPA's rationale in its Final 2008 Effluent guidelines for dental clinics in 2008.

> "EPA....did not identify the dental sector for an effluent guideline rulemaking because as EPA has found with other categories of dischargers, 'demonstrating significant progress through voluntary efforts' gives that category 'a lower priority for effluent guidelines or pretreatment standards revision, particularly when such reductions are achieved by a majority of individual facilities in the industry."[46]

Yet comments sent into EPA earlier this year by the Quicksilver Caucus clearly refute this.

> "QSC members believe that US EPA should pursue effluent guidelines rulemaking for dental facilities that focus on BMP use and amalgam separators in the sector. We do not agree with the US EPA decision in 2008, when it did not identify the dental sector for effluent guidelines rulemaking..."[47]

Under the terms of the MOU, the ADA was to establish a baseline by July 2009 from which progress would be measured and interim goals were to be set by January 2010. ADA provided a baseline Separator Report as scheduled in the MOU.[48] ADA offers through its "Web-Based Survey" that all states reported that 51% of dentists use a separator, and 36.3% in non-mandated states use separators. Yet ADA suggests there is a host of confusing data suggesting a difficult time understanding the data collected to provide an accurate baseline.[49]

Yet state officials dispute such findings, reaffirming that the relatively low overall rate of amalgam separator usage appears to be inconsistent with a finding of "significant progress through voluntary efforts."[50] A national review of various dental mercury amalgam programs by the Quicksilver Caucus found that voluntary efforts have not resulted in reductions by a majority of dental offices. In April 2008, the officials released a white paper comparing the effectiveness of voluntary with mandatory components. The report indicated that dental amalgam separator installation rates were low unless there was a mandatory component.[51]

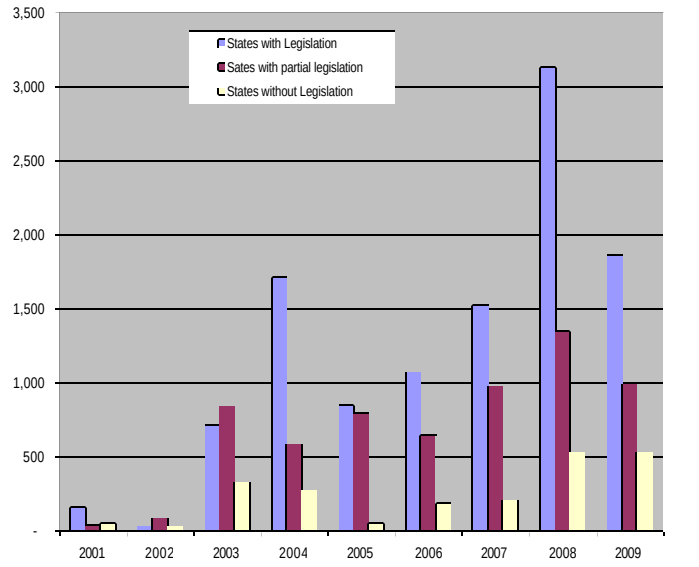
Under the current limitations of the MOU, the best available basis for understanding a baseline is amalgam separator manufacturers' data. In fact, we recommended that EPA look into this nearly a year ago, to no avail.

Not until recently has EPA finally requested that manufacturers offer amalgam separator sales data as a way to develop baseline data. Two companies did not report sales data, but others did. SolmeteX, representing about 70% of the systems sold, provided detailed sales figures.

The data in Table 5 provides a view by state of the number of systems sold in regulated, partially regulated, and non-regulated states. Based on the number of system sales sold by SolmeteX, only 13% of the separators sold have been sold in non-regulated states from 2004 through 2009.[52]

Reading further into the MOU, the discussion appears to indicate that once a baseline is established there would need to be an incremental increase in the number of separator installations per year. So, hypothetically, if the goal is established for a 10% per year increase, at an estimate of 35,000 dental clinic installations, it would take approximately 30 years to gain full compliance.

Table 5. Partial Estimate of Amalgam Separator Sales, 2001-2009



Amalgam separator sales are far greater in states with mandates or partial mandates, than in states without requirements.

Yet well before this, clear evidence of the failure of voluntary programs was documented by a 2008 congressional survey.[53] For example, a ten-year voluntary program in San Francisco resulted in an 8% compliance rate by dentists in installing pollution control devices, called amalgam separators. A similar initiative failed in King County, Seattle, Washington when the local treatment facility entered into an MOU in 1995 to promote use of amalgam separators. After six years, only 2.6% of dentists had installed separators. By contrast, state program with mandatory programs achieve compliance rates approaching 100% of the dentists who routinely remove amalgam fillings.

Also under the MOU, ADA has also generally failed to "expand its program to raise awareness...on the benefits of following the ADA BMPs and the proper ongoing operation and maintenance of the ADA BMPs." The one piece of literature available on the internet that we have been able to find explains that:

> "Dentistry Self-Regulates: A premise of the EPA's decision not to issue a pretreatment standard is the willingness of dentists to act voluntarily. It's important to show that we are making progress to follow the ADA's BMPs and that voluntary installations of amalgam separators is increasing."[54]

The MOU also states that "Not later than one year after the effective date of this MOU (Dec. 2009), the parties intend to establish interim goals" for a "significant increase in the use of amalgam separators." Yet a date for establishing interim goals has not yet been set by EPA.

Further, the EPA, through the EPA-ADA MOU and the Agency's inaction on amalgam mercury, has created a situation where a state law has been enacted[55] to prevent municipalities from controlling mercury from dental dischargers as required by the Clean Water Act and its implementing regulations at 40 CFR Part 403. A regional EPA, after almost two years, has expressed concern about the law.[56]

Clearly, the MOU is a stall tactic to provide for more delays to the adoption of requirements to install amalgam separators. Dentists will only begin reducing mercury pollution right before mandates kick in, according to a congressional study completed after two hearings in 2007 and 2008. The report found that mandatory programs, or voluntary programs backed up with the threat of mandatory programs, are "the most effective model for achieving the desired reduction in mercury releases." In addition, they found that "...whether local dental offices had six months to meet the provision or four years, most practices rushed to be compliant in the last two months before the compliance deadline."[57]

EPA lacks openness and transparency with its dental mercury initiatives

In contrast to the Obama Administration's commitment to openness and transparency, EPA Office of Water efforts at truly engaging NGOs as stakeholders have been lacking when it comes to its dental mercury initiatives. While EPA has written two letters over the past year welcoming "...ongoing interest in (EPA) efforts to reduce mercury discharges into the environment" and "our valuable insights,"[58] their actions speak louder than words. Agency staff have refused repeated requests to provide any updates in writing, seriously engage us as stakeholders, or take our input seriously.

Most recently, an April 5, 2010 letter from EPA to Rep. Dennis Kucinich, Chairman of the Domestic Policy Subcommittee, included the following erroneous statements concerning our involvement related to the Agency MOU with ADA on dental mercury reduction:

> "We also expanded our coordination with stakeholders to include the Quicksilver Caucus, a coalition of State environmental associations who are con-

Taking A Closer Look at the Numbers

- EPA estimates there are 122,000 facilities which would require the installation of amalgam separators. A recent ADA marketing document suggests the ADA Masterfile includes all U.S. dentists and dental students.
- Dentists are broken down by state with a suggested total of 228,115 dentists with 44,575 representing specialists and 184,480 representing general practitioners. Dental specialists in orthodontics, oral and maxillofacial surgery, periodontics, and oral and maxillofacial pathology are not likely to require an amalgam separator.
- This leaves 184,480 general practitioners. Assuming a conservative one-third reduction for multiple dentists per practice, this leaves 121,756 dental facilities which would need amalgam separators, roughly the same as EPA's estimate of 122,000 facilities.
- ADA suggests there are 26,500 systems sold by reporting manufacturers. Assuming 10,000 more units sold by the two remaining amalgam separator manufactures not providing data, this would suggest 36,500 separators sold in the United States. With 122,000 facilities placing or removing amalgam, this represents approximately 30% installation of amalgam separators in the United States. Assuming 15,000 additional separators sold by non-reporting manufactures would represent only a 34% installation of amalgam separators. This appears to call the ADA's assessment of 51% compliance nationally into question.

The survey data offered by ADA appears inflated and with ADA and/or its state dental chapter's track record of actively opposing separator requirements it should be of little surprise. ADA continues to present information to its membership on the web:

"Dental amalgam has little effect on the environment. Less than one percent of the mercury released into the environment comes from dental amalgam. Even this amount is not in the form found in fish, which is the greatest concern."[59]

cerned with mercury discharges, and also with the Mercury Policy Project, which is an NGO focused on reducing mercury from all sources. As all the parties continue to coordinate on next steps, we look forward to narrowing the performance goals and agreeing on best approaches to encourage installation of separators."

On several occasions, we asked to be included in Agency stakeholder discussions on the MOU, but this request has never been granted. A June 15, 2009 a letter was sent from over 25 state and national environmental groups to EPA Administrator Lisa Jackson, urging her to terminate the MOU and instead move forward with goal-based regulatory controls and dental mercury releases. In our letter, we also expressed dismay that our participation in discussions about the MOU is contingent upon ADA's approval, according to EPA staff.[60]

The July 20, 2009 response back from EPA Office of Water states that "As our senior political advisors are confirmed by the Senate and assume their responsibilities as Assistant Administrators, the Agency will have the opportunity to consider the larger issues of a comprehensive mercury strategy..." and that EPA will defer on the decision on "the withdrawal from the MOU until EPA has an opportunity to consider the larger issue of a comprehensive strategy."[61]

In our follow up email, we raised questions about ADA, in terms of complying with the terms of the MOU to develop a baseline report estimating the current level of amalgam separator usage and to establish a tracking program. In addition, his email stated that this slippage may also have implications on establishing interim goals within one year (Dec. 2009) and, most importantly, affect the overall goal of the MOU to "... demonstrate a significant increase in the use of amalgam separators within a reasonable amount of time..."

Conclusion

In summary, it is clearly more cost effective to eliminate mercury from a waste stream prior to trying to address it at the end of the pipe or when it is being incinerated. According to a study conducted by the Quicksilver Caucus, initiatives in several states demonstrate that the dental sector is significantly reducing mercury pollution through implementing Best Management Practices, which include the installation and proper use of amalgam separators.

An example of such reductions is a publicly owned treatment plant in the Minneapolis/St. Paul area which has cut influent levels in half now that its dental clinics have installed amalgam separators. Another example is the Massachusetts Water Resources Authority (MWRA). MWRA operates the largest wastewater treatment plant in Massachusetts, servicing about 2.5 million people. When amalgam separator use increased to over 80%, mercury levels in MWRA sludge decreased by about 48%.[62]

In another example, in a rule current EPA Administrator Lisa Jackson authorized when she was Commissioner of the New Jersey Department of Environmental Protection, it was noted that the annual cost per pound of mercury removed from dentists' offices through the use of pollution control equipment (combination of best management practices and operation of amalgam separators) was far less than the cost per pound of capturing mercury from incinerator flue gases:

> "...ranges from $5,100 to $7,700 (including costs associated with compliance with the BMP and recycling of captured material). In comparison, these cost estimates are far lower than the range of costs estimated by the Department for other types of facilities that are now required to reduce mercury emissions. For example, in the Department's proposal for air pollution control regulations (see 36 N.J.R. 123(a)), which have since been adopted (see 36 N.J.R. 5406(a)), the Department estimated that the costs for the installation or upgrading of mercury emission controls by municipal solid waste incinerators, iron and steel manufacturing facilities, and coal-burning utilities would be in the range of $5,000 to $40,000 per pound of mercury reduced."[63]

Recommendations

1) **EPA should maintain an open and transparent process to address dental mercury.** To uphold the Obama administration's commitment, EPA must maintain an open and transparent process. Non-governmental organizations (NGOs) should be recognized as full stakeholders in this process, be kept informed of all developments and allowed to participate in Agency stakeholder meetings concerning dental mercury.

2) **EPA should develop regulations to prevent mercury pollution from the dental sector.** EPA should terminate the MOU and work with all relevant stakeholders to draft an agreement to achieve significant reductions in dental mercury releases in a timely manner through "goal based" regulatory controls, including mandatory employment of best management practices and amalgam separators

3) **EPA should update its emissions inventory.** EPA should update its outdated 2002 emissions inventory for dental mercury and correct its misrepresentation that the dental community has "made significant progress through voluntary efforts." EPA should regulate mercury emissions from cremation, given the increasing significance of this source.

4) **EPA should establish guidelines for mercury discharges from all dental facilities.** EPA should establish Effluent Guidelines, including installation of amalgam separators and implementation of other Best Management Practices (BMPs), for dental discharges of amalgam mercury, as it does for other sectors of businesses engaged in similar activities. As with other effluent guidelines, this would assure that a minimum level of treatment is implemented by all covered dental facilities reduce mercury, guaranteeing a level playing field for all dental facilities. This would continue to allow state and local governments to regulate sources with more specific controls if mercury discharges were identified as a problem.

5) **EPA technical documents should clearly state that pollution controls are required when mercury is a pollutant of concern.** EPA should coordinate within the Water Program to ensure that guidance states that mercury controls are required where mercury is a pollutant of concern consistent with the Clean Water Act. EPA has provided confusing and contradictory language in its recent methylmercury permitting guidance.[64] The April 2010 EPA guidance reflects the EPA-endorsed ADA stance that even where mercury being discharged to the environment is exceeding a permit limit or water quality standard (e.g. Great Lakes),[65] EPA will go no farther than recommending voluntary amalgam separator installation and other BMPs for dental facilities. This continues the Agency's acquiescence to the ADA by allowing variances to mercury water quality standards for the Great Lakes and other sensitive waters rather than clear, mandatory requirements for reducing mercury discharges to the environment.

Endnotes

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22. Ibid.
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