SF Bay Mercury
Deadline: 4/4/07 Noon

April 4, 2007

California State Water Resources Control Board
1001 "I" Street
Sacramento, CA 95814

RE: **Amendment to the Water Quality Control Plan for the San Francisco Bay Region to Establish Mercury Fish Tissue Objectives, Vacate a Mercury Water Quality Objective, and Establish a Total Maximum Daily Load (TMDL) for Mercury in San Francisco Bay**

Dear Members of the Board:

The California Dental Association, representing approximately 24,000 of the state's dentists, has observed and at some levels participated in the process leading to development of the current basin plan amendment and revised TMDL. Several years ago, actions by a local POTW to regulate dental office wastewater discharges for mercury led to a lawsuit and subsequent agreement for the San Francisco Regional Board and State Board to conduct further study of mercury sources to San Francisco Bay, as well as assess various measures to reduce mercury in the bay. At that time, dentists in the Bay Area were dismayed to learn they were targeted for new regulations. Dentists, with their science-based training and knowledge of the impact of local cinnabar mines and gold mines, instinctively protested a seemingly unfair and non-science based approach to reducing mercury in the bay. We at CDA sought better information, through research, and understanding of dentistry's actual contribution to mercury in the environment.

Through the processes of scientific investigation and ongoing discussions with POTWs and the regional board, CDA and its members have come to understand the Clean Water Act, its requirements, and the responsibilities of the respective agencies. We have also learned a little bit more about dental amalgam and its environmental impact. The American Dental Association commissioned a scientific assessment (a summary is attached) which indicates that dental amalgam is less than one percent of all mercury emissions to U.S. surface waters. We do not know that dental amalgam in the environment is a significant source of methyl mercury. There is a lack of definitive research in this area. Nonetheless, we believe it is prudent for dentistry to take steps to reduce the release of amalgam waste or any potentially harmful materials to the environment because dentistry's role as a public health profession naturally includes environmental stewardship.

CDA initiated a state-wide awareness and education program on the proper management of amalgam and other dental office wastes. We've partnered with several POTWs and the Bay Area Pollution Prevention Group to provide these programs. Articles have been published in the peer-reviewed CDA *Journal* and in local dental society newsletters. Several continuing education presentations have been made at state and local dental meetings.

More importantly, we have worked with individual POTWs that had decreased mercury limits placed in their NPDES permits, to implement dental wastewater discharge permit programs that include the use of amalgam separators. CDA did this because (1) we recognize that POTWs must make every effort to meet NPDES permit conditions and (2) we wanted to have actual data, rather than extrapolations from

California Dental Association
1201 K Street, 14th Floor, Sacramento, CA 95814 | t. 800.232.7645 | p. 916.443.0505 | f. 916.443.2943 | cda.org

laboratory data, on the effectiveness of amalgam separators on the mercury levels of treatment plant effluent. We know that controlling effluent mercury levels is a key condition in NPDES permits. The San Francisco Regional Board now has data from the three POTWs that have amalgam separators as part of their dental wastewater permit program. Data post-installation of amalgam separators show that mercury levels in plant biosolids has decreased significantly, but the impact of separators on effluent mercury levels is inconclusive. This data appears to be consistent with the conclusions reached in the ADA-sponsored assessment.

That is why we are surprised that the proposed basin plan amendment contains a target that 85 percent of the dental offices in the region will participate in an amalgam program within five years of adoption. We do not support the inclusion of this target in the amendment and question whether this target should be included since, as it is noted on page III-11:

> Consistent with Remand Order Resolved 4, the Water Board will not, where it cannot, specify the manner of compliance with this or other requirement of the Mercury TMDL Amendment. Dischargers are responsible for investigating the sources and strategies for controlling those sources.

While CDA will continue to work with individual POTWs as they implement dental wastewater programs with amalgam separators, we do not support having this target included in the basin plan amendment, thereby placing pressure on POTWs to direct valuable resources to a program that may have little impact reducing effluent mercury levels. CDA recommends that the POTWs be allowed to investigate the mercury sources to their respective plants and to develop strategies appropriate to their targets and priorities.

The effort to regulate dental office wastewater has elevated interest levels of individual dentists in local environmental issues and in what state and local officials are doing. CDA would like to inform our membership that serious efforts are being made to reduce pollution from the San Francisco Bay's largest mercury sources, the mines. We recognize that the adoption of the basin plan amendment and revised TMDL is a necessary part of a legal process and thus its development has commanded significant staff resources. We also recognize that mercury mine remediation will require massive financial resources. As this regulatory phase draws to a conclusion, CDA urges the state and regional water boards to take timely and effective actions to reduce or eliminate mine pollution.

Respectfully,

Teresa J. Pichay

Teresa J. Pichay
Policy Analyst

Enclosure

California Dental Association
1201 K Street, 14th Floor, Sacramento, CA 95814 | t. 800.232.7645 | p. 916.443.0505 | f. 916.443.2943 | cda.org

American Dental Association
www.ada.org

August 5, 2005

Summary of Recent Study of Dental Amalgam in Wastewater

Prepared by the American Dental Association

Mercury in surface waters is a topic gaining much attention. The primary source of mercury in surface waters is air deposition. Nevertheless, in some areas, there is increased regulatory pressure to control mercury in wastewater discharged to surface waters. When this occurs, estimates of the environmental contribution of mercury from dental office wastewater (in the form of dental amalgam, a stable alloy of silver, tin, copper, zinc and elemental mercury) may need to be considered. As a result, it is important that scientifically sound numbers be developed to identify the actual and relative contributions of mercury from dental office wastewater. Further, an assessment of the actual amount of dental amalgam captured by various dental office controls is needed.

The American Dental Association commissioned a scientific assessment of these and other questions. The assessment was submitted to various EPA officials, the Association of Metropolitan Sewerage Agencies (AMSA), and other reviewers. The basic conclusions of the assessment are consistent with other studies cited in the assessment. This assessment titled, "An assessment of mercury in the form of amalgam in dental wastewater in the United States" is published in the peer-reviewed journal, *Water, Air and Soil Pollution.*[1]

Amalgam particle waste is generated during placement or removal of amalgam restorations. Most of the amalgam waste discharged in dental office wastewater is in the form of particles. A scientific assessment was recently conducted to estimate the amount of amalgam waste in wastewater, how much of it reaches wastewater treatment plants, and how much of it is discharged by the treatment plants to surface waters. A summary of the results of this assessment follows.

Measuring the exact amount of amalgam waste being generated and discharged from a dental office is a very difficult task. The discharge of amalgam waste into sewerage systems is complicated by the fact that this waste is generated on an intermittent basis with huge day-to-day and even minute-to-minute variations. Methods such as sampling from drain or sewer lines, or even collecting total waste over several days show huge variations that are difficult to extrapolate into total waste generated over a year. For these

[1] Vandeven JA. McGinnis SL. An Assessment of Mercury in the Form of Amalgam in Dental Wastewater in the United States. Water Air & Soil Pollution. 2005 June;164(1-4):349-66.

reasons, sampling dental office wastewater discharge does not provide either an accurate or reliable estimate of discharge.

One common engineering method employed in environmental science to overcome this limitation is the mass balance approach. This method uses existing data on the total amount of amalgam used, the known performance of existing capture devices, and the types and proportions of waste generated when placing and removing amalgam restorations to determine how much and where this waste is either being captured or discharged. The mass balance assessment tracks the total amount of amalgam used and removed from the dental office source, all the way through the waste processing and collection system, to determine both where the amalgam waste ends up and how much is captured at each part of the process.

In a mass balance assessment of the annual amount of amalgam discharged in dental wastewater nationally in 2001, it was estimated that 29.7 tons of mercury in the form of amalgam was discharged into dental units by dental offices. Chair-side traps in dental units and vacuum pump filters captured 78% (23.2 tons) of the mercury in the form of amalgam. Approximately 6.5 tons of mercury in the form of amalgam discharged from dental offices was determined to have reached the wastewater treatment plants, which captured 6.2 tons (95%) of this discharge. The remaining 0.3 tons was discharged as effluent to surface waters.

Of the 6.2 tons of mercury (in the form of amalgam) captured by wastewater treatment plants nationally, 1.6 tons was disposed of in the form of filter grit solids and 4.6 tons ended up in treatment plant biosolids. Approximately 1 ton of the biosolids was incinerated nationwide, with the incinerator emission controls capturing 0.8 tons of the mercury. This resulted in 0.2 tons of mercury being emitted to the atmosphere. Of this atmospheric emission, approximately 0.1 ton was deposited in the United States, (based on an EPA estimate that one third of the atmospheric mercury generated in the United States is eventually deposited in this country). Thus, based on this mass balance assessment, a total of 0.4 tons (0.3 tons from wastewater treatment plant effluent and 0.1 ton from air deposition) of mercury entering surface waters in the United States could be attributed to dental office discharge.

It is important to put this number in context. In the 1997 EPA Mercury Study Report to Congress, it was estimated the mercury emission in the United States is 158 tons annually. Thus an estimated 52.6 tons is deposited, based on the EPA estimate that one third of the mercury emission is deposited in this country. By comparison, the 0.4 tons from amalgam waste entering surface waters is 0.76% of the estimated deposit for all mercury emission in the United States.

It is also useful to assess the additional amount of dental amalgam likely to be captured through the use of ISO-compliant amalgam separators, and at what cost. The assessment[1] addresses both of these points. The use of ISO-compliant amalgam separators (95% amalgam removal efficiency) would reduce the estimated discharge of mercury in the form of amalgam to wastewater treatment plants to 0.3 tons. Due to the size distribution of amalgam particles, this form of mercury in the form of dental amalgam is unlikely to be captured by the wastewater treatment plant and would be discharged in the effluent. In other words, the use of separators is unlikely to have any material impact on mercury in treatment plant effluent—the amount so discharged, with or without separators, is approximately 0.3 tons. The use of amalgam separators, however, would likely result in the virtual elimination of the deposition of 0.1 ton of mercury from the incineration of amalgam in biosolids.

With an estimated annual cost of $76 million to $114 million for the purchase, installation and maintenance of amalgam separators in dental offices in the United States, the annual cost of removing 1 ton of mercury through amalgam separators is estimated to be $760 million to $1.14 billion. Even if the use of amalgam separators could reduce the mercury in wastewater treatment plant effluent by 29% (an unlikely result) resulting in 0.2 tons of mercury discharged to surface waters, the annual cost of removing 1 ton of mercury is estimated to be $380 million to $570 million.

The American Dental Association has published a set of recommended Best Management Practices for Waste Amalgam. These BMPs have been widely distributed, in a variety of formats, to dentists throughout the country. Compliance with the BMPs will result in substantial reductions of dental amalgam in dental office wastewater, without the extraordinary costs of mandatory separators. The BMPs are available on www.ada.org/goto/amalgambmp. For more information contact the ADA's Division of Science at 312/440-2878 or science@ada.org.

Numerical Summary

Mercury in the form of amalgam discharged into dental units: 29.7 tons

Mercury in the form of amalgam captured by chair-side traps and vacuum pump filters: 23.2 tons

Mercury in the form of amalgam reaching publicly owned treatment works (POTWs): 6.5 tons

Mercury in the form of amalgam captured by POTWs in grit solids and biosolids: 6.2 tons

Mercury in the form of amalgam discharged as effluent from POTWs to surface waters: 0.3 ton

Mercury in the form of amalgam in POTW biosolids: 4.6 tons

Mercury in the form of amalgam in POTW biosolids incinerated: 1.0 ton

Mercury from amalgam captured by incinerator emission controls: 0.8 ton

Mercury from amalgam emitted to the atmosphere from incineration of POTW biosolids: 0.2 ton

Mercury from incinerated amalgam deposited onto US surface waters: 0.1 ton

Total mercury in surface water attributable to amalgam in dental office wastewater: 0.4 ton

Number of dental offices to install amalgam separators: 95,066

Cost of purchase, installation and maintenance of amalgam separators: $76 million-$1.14 billion

Mercury in the form of amalgam reaching POTW after installation of amalgam separators: 0.3 tons

Mercury in the form of amalgam discharged as effluent from POTWs to surface waters after installation of amalgam separators: 0.3 ton

Mercury from incinerated amalgam deposited onto US surface waters after installation of amalgam separators: 0 ton

Total mercury in surface water attributable to amalgam in dental office wastewater: 0.3 ton

Reduction of mercury in surface waters attributable to amalgam in dental office wastewater after installation of amalgam separators: 0.1 ton

Cost of removing 1 ton of mercury through amalgam separators: $760 million-$1.14 billion

Cost of removing 1 ton of mercury through amalgam separators assuming 29% reduction of mercury in POTW effluent: $380 million -$570 million