

PRETREATMENT CORNER

Mercury Revisited

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About five years ago, an article was written for the Keystone Water Quality Manager entitled the *Sources of Mercury in Wastewater* (January/February 2004 issue). The presence of mercury in wastewater is still a concern. Therefore, this article continues the 2004 discussion.

EPA provided a webcast presentation in June 2009 concerning mercury discharges at POTWs. The webcast is still available for viewing at EPA's website under NPDES training. In addition, the presentation slides may be downloaded.

The webcast discussed the Dental Amalgam detailed study, which was conducted by the health services industry (primarily the American Dental Association - ADA) in cooperation with EPA. The study is documented at: <http://www.epa.gov/waterscience/guide/304m/2008/hsi-dental-200809.pdf>. So what is dental amalgam? Dental amalgam is the most commonly used dental restorative material for dental fillings. The amalgam typically contains mercury mixed with one other metal. Other metals may include silver, tin, copper, zinc, indium and palladium. Of the dental amalgam constituents, mercury is of greatest concern to human health because it is a persistent, bioaccumulative, toxic chemical and can bioaccumulate three to ten times across each trophic level of the food chain. For wastewater mercury discharges, the major route for human exposure is the consumption of mercury-contaminated fish.

The composition of mercury discharged from dental offices is important to POTWs because it can affect the POTWs' ability to remove mercury from influent wastewater. Solid mercury particles will likely settle out of solution and adsorb to the wastewater treatment sludge. However, dissolved mercury can pass through treatment operations and enter surface waters. Dissolved mercury is of concern because it can be converted to methylmercury by different strains of sulfate-reducing bacteria found in wastewater and is a more toxic form of mercury.

The study estimates that half of the mercury discharged into wastewater is from dental offices. One of the technologies that may be used by a dental office to reduce mercury concentrations before the wastewater is discharged to a public sewer system is an amalgam separator. Some POTW pretreatment programs across the U.S. have implemented requirements for the installation of amalgam separators at the dental offices in their sewer service areas. The ADA is also promoting the installation of amalgam separators as a Best Management Practice (BMP) to its members. In addition, some states have enacted legislation requiring the installation of amalgam separators and/or implementation of BMPs.

Common elements found in many of the dental mercury programs implemented across the U.S. that a pretreatment coordinator may want to include as part of his/her pretreatment program include the following:

1. Identification of sources of Mercury in wastewater.
2. Development of BMPs and a mercury reduction program.
3. Conduct public outreach and education activities.
4. Inspection of facilities and monitoring for mercury to determine compliance and/or mercury reductions in wastewater.

A mercury reduction program may also include compliance with mercury limits if the POTW has other sources of mercury within its sewer service area and needs to develop a mercury local limit.

There are many resources available on the internet to help you develop your own mercury reduction program if mercury is an issue in the POTW effluent discharge or biosolids. Many of these resources are based in the Great Lake states and the Northeast U.S. The following is a short list of references that were used in this article and previous research in addition to the dental amalgam study referenced earlier in this column:

- http://www.epa.gov/npdes/outreach_files/webcast/jun2309/145853/presentations_download.pdf
- http://www.wlssd.com/WLSSD_Blueprint_Mercury_Reduction.pdf.pdf
- <http://www.werf.org/AM/CustomSource/Downloads/uGetExecutiveSummary.cfm?File=ES-05-WEM-ICO-COa.pdf&ContentFileID=11419>
- http://www.michigan.gov/deq/0,1607,7-135-3307_29693_4175---CI,00.html
- <http://www.pca.state.mn.us/programs/p2-s/pubs/cs-newinitiatives.pdf>