

**City of Boulder
Dental Mercury Reduction Program
Frequently Asked Questions**

Why does the city have to implement new regulations now?

The city of Boulder was issued a revised permit in 2003. This required strict low-level mercury sampling and limits the amount of mercury discharged from the wastewater treatment plant (WWTP) to 12ng/L. Since 2003, effluent samples have shown levels as high as 25.7ng/L. Furthermore, in Colorado, state agencies regulate wastewater treatment plants, which in turn have the authority to regulate business and industry that discharge wastewater upstream of the plant. The goal of the Pretreatment program is to be in compliance 100% of the time and protect the wastewater utility which, in turn, protects the environment.

Who will the regulations affect?

Proposed regulations will be applicable to all dental practices within the city of Boulder that discharge wastewater from the placement or removal of amalgam containing mercury or teeth contain amalgam.

Waivers will be granted to dental practices in which no dentist places or removes amalgam containing mercury and/or teeth containing mercury amalgams. A written request for a waiver must be sent to the city of Boulder's Industrial Pretreatment Program, 4049 N. 75th St., Boulder, CO 80301.

Exclusions *may* include: periodontists, orthodontists, endodontics, and oral surgeons.

Why is the city looking at mandating instead of a voluntary program?

In 1997, the city of Boulder started working with dentists who wanted to voluntarily reduce their mercury discharge. With funds from the Colorado Department of Public Health and Environment (CDPHE), the city of Boulder developed outreach material and created the Dental Waste Pollution Prevention Program.

In addition, the city of Boulder works alongside Partners for a Clean Environment (PACE) to educate dental practices on Best Management Practices (BMPs) and amalgam separators.

Currently, 14 out of 95 dental offices have voluntarily installed an amalgam separator.

How is the mercury level in wastewater measured?

Mercury in wastewater is measured following U.S. Environmental Protection Agency (EPA) protocols. Samples for mercury at the wastewater plant are collected utilizing "clean sampling techniques" to prevent or minimize sample contamination. Analysis for mercury follows EPA method 1631 for low level detection. Method 1631 can analyze mercury to as low as 2.5 nanograms per liter (ng/l). Analyses of samples with higher mercury concentrations utilize EPA method 245.1.

What level is determined to be a significant level of contamination?

The city of Boulder wastewater treatment plant discharges treated effluent to Boulder Creek. This discharge is regulated by a state issued Colorado Discharge Permit System (CDPS) permit. The limit for mercury released to the creek is 12 ng/l. Mercury monitoring over the last 3 years has shown a data range of 4.2 ng/l to 25.9 ng/l.

What is the American Dental Association's stance on recycling and amalgam separators?

Since the early 1980's, the ADA has advocated for the proper handling and recycling of amalgam tooth-filling wastes from dental offices.¹

In February 2004, the ADA published Best Management Practices (BMP) for Amalgam Waste. In this document, the ADA strongly recommended recycling as a BMP for dental offices. Furthermore, the ADA states, "amalgam should not be disposed of in the garbage, infectious waste, "red-bag" waste or the sharps container..."²

Do other utilities have mercury programs?

Across the nation, state and local governments are developing programs and regulations that address mercury, including dental mercury. States such as Maine, New Hampshire, New York, Connecticut and Vermont and cities like Seattle, WA, Minneapolis, MN, Milwaukee, WI, Wichita, KS, and Fort Collins, CO all have regulations concerning amalgam separators.

Isn't mercury within amalgams stable?

When mercury ends up in Colorado's lakes, rivers and streams, microorganisms convert some portion of this mercury into methylmercury, a toxic compound. Methylmercury bioaccumulates in fish, and presents a health risk to the humans and wildlife that consume the fish.

Dental offices contribute to the release of mercury to surface water through normal operating practices that involve handling and disposal of mercury-containing amalgams. The bioavailability of mercury contained in waste amalgam is currently under study, and therefore the relative contribution of 'dental mercury' to the greater mercury problem is unknown.

Nonetheless, Colorado has joined other states in taking a precautionary approach to the handling and disposal of waste dental amalgam.²

Aren't chair-side traps and vacuum filters enough?

Chair-side traps and vacuum filters are designed to protect the dental equipment. While doing so, traps and filters do capture a portion of the mercury waste. However, the amount of mercury that is actually captured by the traps and filters varies. One study found that 40.2% of the amalgam removed was trapped by the conventional traps, and 59.8% by passed both traps.³

Can the city of Boulder provide any type of scientific study data that demonstrates that the primary source of mercury contamination actually, in fact, is from dental office effluent?

There is a large body of published data detailing the impact of wastewater containing amalgam on local wastewater treatment plants. Sampling of wastewater contributions throughout the city of Boulder has also shown elevated mercury concentrations from dental offices. Dental office samples collected in 2006 showed a concentration range of 140 ng/l to 15,000 ng/l. Dental office samples collected in 1998 showed a concentration range of 400 ng/l to 160,000 ng/l.

In comparison monitoring around Boulder from university sites, hospital sites, domestic sites and commercial sites, mercury levels have predominately been below detection (EPA 245.1).

Occasional peaks are measured but are a rarity rather than the norm. Finally, industries involved in manufacturing are monitored for mercury and regulated according to local pollutant limitations.

There are over ninety (90) dental offices in Boulder; if each of these offices contributes just a small amount of dental amalgam containing mercury then Boulder's wastewater plant has a problem. The wastewater treatment plant is designed to treat household wastewater and has no specific removal technologies for mercury.

What is the approximate dental contribution to mercury within the wastewater stream?

Although dental sources make up little of the total environmental mercury, dental practices are one of the main contributors to mercury within the wastewater stream. A 2001 study by the Association of Metropolitan Sewerage Agencies looked at seven dental WWTPs and found that dental practices were, "by far" the greatest contributors. Furthermore, the report found that dentists accounted for 40% of the mercury load to WWTP; three times the next largest source.⁴ According to the ADA, 35 to 45 percent of the mercury entering POTWs comes from dental facility sources.⁵

How much will a separator cost?

Typical costs range from \$300-\$2000 in purchase, approximately \$200 for installation and between \$75-\$750 for annual maintenance (including waste disposal).⁷ Please see Table 1 & 2: ADA⁸ & EPA Reg. 5⁷

Do separators truly remove mercury from the wastewater stream?

A report by the ADA showed that the amalgam separators they tested removed at least 96.09% of the amalgam in samples with particle-size distributions as specified by the International Organization for Standardization (ISO). All twelve separators that were tested exceeded the ISO 11143 standard.⁸

A study conducted by the state of Vermont Environmental Conservation demonstrated that there are several commercially available collectors that can reliably perform with minimal maintenance.⁹

How long will dental practices have to complete installation and be in compliance with the proposed regulations?

If regulations are finalized, dentists will have six months to implement and self certify compliance with Best Management Practices. After the effective date, dentists will have one year to install an amalgam separator.

Isn't the problem with environmental mercury due to air disposition and runoff from historic mining activities and not dental offices?

Although it may be true that dental offices contribute a small percentage to the total environmental mercury problem, dental offices are an identifiable and preventable source of mercury within the wastewater stream. Furthermore, dental offices are a significant contributor to the mercury levels within the wastewater stream.

Discharges from dental facilities to WWTPs are a minor source of mercury to the nation's waters. Why waste the resources?

Where mercury is not a problem at the WWTP, the WWTP is not required to do anything (though Reg. 8 supports voluntary programs). The contribution of mercury to a WWTP and the receiving water may be significant in some cases. Where a discharge is above the level allowed by the underlying water quality standards, the mercury must be reduced. The Pretreatment Program addresses these sources while other environmental groups address other sources of mercury. Implemented together,⁶ the various environmental programs will reduce the overall mercury load to the environment.

What other sources of mercury are there?

Mercury is also found in medical settings, laboratory settings and in residential settings. Thermometers, pharmaceutical products, cleaning and even degreasing products can contain small amounts of mercury. In medical and laboratory settings, users are encouraged find alternate chemicals or manage the chemicals such that mercury does not enter the environment, including the sewer system. Residents may drop off mercury containing products to the Boulder County Household Hazardous Waste Collection Center (303) 441-4800.

<http://www.co.boulder.co.us/recycling/hhw/hhwhome.htm>

Sources:

1. American Dental Association (July, 2002). "ADA Statement: Dental Amalgam in Dental Office Wastewater"
<http://www.ada.org/prof/resources/positions/statements/amalgam4.asp>
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3. Adegbembo, A., Watson, P., Lugowski, S. "The Weight of Wastes Generate by Removal of Dental Amalgam Restorations and the Concentration of Mercury in Dental Wastewater." *J Can Dent Assoc* 2002; 68(9) 553-58.
4. Association of Metropolitan Sewerage Agencies, 2002 (March, Amended July 2002). "Mercury Source Control & Pollution Prevention Program Evaluation. Final Report." Prepared by Larry Walker Associates.
5. Eichmiller, *Statement of the ADA to the Wellness and Human Rights Subcommittee, Government Reform Committee, United States House of Representatives, on The Environmental Impact of Mercury Containing Dental Amalgam, October 8, 2003.*
6. US EPA Reg. 8 POTW Mercury Control Strategy Draft. May 2005.
7. EPA Reg.5: Options for Dental Mercury Reduction Programs: Information for State/Provincial and Local Governments. Revised August 2004.
<http://www.epa.gov/region5/mercury/dentaloptions3.pdf>
8. Fan, P.L., Batchu, H., "Laboratory Evaluation of Amalgam Separators." *JADA*. 2002; 133, 577-599. http://www.ada.org/prof/resources/pubs/jada/reports/report_separator.pdf
9. Vermont Dental Amalgam Separator Pilot Project. August 2004.
<http://www.anr.state.vt.us/dec/ead/mercury/PDF/AmalgamSeparatorReport.pdf>

Additional Sources:

PACE- Partners for a Clean Environment, www.bouldercolorado.gov/www/pace/index.html