

PRETREATMENT CORNER

Sources of Mercury in Wastewater

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Mercury is a naturally occurring metal that is present in several forms. Metallic Mercury is a shiny, silver-white, odorless liquid. Mercury combines with other elements, such as chlorine, sulfur or oxygen, to form inorganic mercury compounds or salts, which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. Some of the more common sources of Mercury found throughout the environment include, but may not be limited to, the following: household bleach, acid and caustic chemicals (e.g., battery acid, household lye, muriatic acid (hydrochloric acid), sodium hydroxide and sulfuric acid), instrumentation containing Mercury (e.g., medical instruments, thermometers, barometers and manometers), dental amalgam (fillings), latex paint (manufactured prior to 1990), batteries, electric lighting (fluorescent lamps, incandescent wire filaments, mercury vapor lamps, ultraviolet lamps), pesticides (restricted and/or banned under FIFRA since 1995), pharmaceuticals (e.g., nasal sprays, cosmetics, contact lens products), household detergents and cleaners, laboratory chemicals, inks and paper coatings, lubrication oils, wiring devices and switches, and imported textiles (Mercury is used as a preservative and is released through laundering). Though Mercury use in many of the above items being produced now is restricted or banned, there still may be some existing, older products still in use.

Chlorine, Potassium Hydroxide, Sodium Hydroxide and Sulfuric Acid may be produced using a mercury-cell process. More and more chemical manufacturers are finding alternate means for producing these chemicals, though there are still a few manufacturing facilities using the mercury-cell process. It would be prudent to contact your chlorine supplier to determine whether the chlorine used for disinfection at the wastewater treatment plant contains Mercury.

Residential customers may unknowingly wash mercury products such as cosmetics, household cleaners and eye products down the bathroom sink. Mercury is used in these household products as a preservative and/or mildewcide. We have all seen the fish consumption advisories, some of which are due to Mercury, others to PCBs. A study conducted by the Association of Metropolitan Sewerage Agencies (AMSA) revealed that levels of Mercury in human excrement, independent of household products, is substantial. The study further showed that some foodstuffs contain appreciable levels of Mercury. This report is viewable at www.amsa-cleanwater.org/pubs/mercury/mercury.pdf.

Commercial facilities that may conduct any of the above named activities and have the potential to discharge Mercury to the sewer system include the following: dental, medical and veterinary offices, hospitals and laboratories, automotive lube and repair shops, car washes, dry cleaning establishments, funeral homes, printers and photoprocessors.

Some of the more common industrial facilities that may have processes using or generating products containing mercury include the following: industrial laundries, battery manufacturing, chemical manufacturing, corrugated box manufacturing, dye and ink formulation, mineral or ore processing, pharmaceutical manufacturing, plastics manufacturing (Mercury used as catalyst for curing process), textile manufacturing, and equipment manufacturing.

Wastewater treatment plants may also have items onsite that contain Mercury. Think of all those fluorescent lights, thermostats, switches, deteriorating pesticides stored in the garage, trickling filter arm bearings (now discontinued but old ones may still exist), conveyor belt counterweights and laboratory reagents.

When metallic Mercury is improperly disposed down a sink or floor drain it may collect in the trap or other low point in the sewer system because of its high density and low water solubility. Sewer cleaning practices, such as flushing sewer lines, may loosen the sediment and send the Mercury to the wastewater treatment plant.

Therefore, it may not be uncommon to see unexplained spikes of Mercury in the influent to a wastewater treatment plant.

DEP has been known to impose low levels of Mercury in NPDES permits, which are often based on human health water quality criteria to protect downstream public water supplies. Many commercial laboratories are equipped to analyze Mercury using EPA Methods 245.1, Manual Cold Vapor Technique, or EPA Method 245.2, Automated Cold Vapor Technique, which obtain a detection level of 0.0002 mg/L, at best. They may not be equipped to conduct the newer approved test method, EPA 1631, Mercury in Water by Oxidation, Purge and Trap and Cold Vapor Atomic Fluorescence Spectrometry. While the minimum level (ML) of quantitation for this newer test method is 0.5 ng/L (equivalent to 500 µg/L) and would satisfy the lower permit limits, 0.000083 mg/L in one NPDES permit, for example, there is not widespread use by laboratories of this method for Mercury at this time. However, if you are one of the unfortunate ones with a low Mercury permit limit, you will need to find a laboratory that can analyze wastewater in the ng/L range. This low range will be necessary for investigative purposes to determine the sources of Mercury in your sewer service area.